



DIRECTOR'S MESSAGE

The Research Laboratory of Electronics (RLE), founded in 1946, is the Institute's first interdisciplinary research laboratory. RLE grew out of the wartime MIT Radiation Laboratory and was formed to bring together physicists and electrical engineers to work on problems in electromagnetic radiation, circuits, and specialized vacuum tubes. Over the years, RLE's research interests have branched in many directions, so that today it is the most diverse of MIT's interdisciplinary research laboratories, with approximately 50 affiliated faculty pursuing groundbreaking research across six research themes. Their achievements, during the 2006-2007 academic year, are described in this Progress Report.

The past year witnessed many important accomplishments for the Laboratory. Notable in this regard was the launching of the W. M. Keck Foundation for Extreme Quantum Information Theory. The Center, known by its acronym xQIT, is led by Professor Seth Lloyd (Director). Although xQIT relies on RLE for administrative support, its faculty researchers are drawn from throughout the Institute's trans-departmental activity in quantum information science. The xQIT faculty are conducting research into the fundamental physics of information processing. Their work is oriented towards solving three well-known hard theoretical problems in quantum information science: What problems can computers solve if they operate using the entire repertory of physical phenomena, including strange quantum-mechanical effects such as entanglement? What are the ultimate limits on the capacities of communication channels when their performance is limited by noises of quantum-mechanical origin? How accurately can we measure and control the universe around us when confronted with limit set by quantum physics?

The highlight of the 2006-2007 academic year was marking the 60th anniversary of RLE's founding — and looking ahead to RLE's future — with a series of celebratory events occurring throughout the academic year. Professor Leslie A. Kolodziejski chaired the RLE 60+ Committee that organized the Beyond the Limits Colloquium Series, the RLE 60+ Technical Gala, and the RLE 60+ Family and Friends Carnival. Beyond the Limits brought research leaders from RLE's six research themes to share the excitement of their work and to provide glimpses into the future. Videos from the Beyond the Limits Colloquia can be viewed on the RLE website at http://www.rle.mit.edu/media/media_videorle.html.

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