



## 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 2007-2008 academic year, are described in this Progress Report.

The past year witnessed many important accomplishments for the Laboratory, as the chapters that follow amply attest, but I will just point to one very recent event of special note. The National Science Foundation (NSF), through its Integrative Graduate Education and Research Traineeship (IGERT) program, has awarded a \$3M grant to Prof. Isaac Chuang, to fund a pioneering MIT program with the goal of creating a new cohesive, interdisciplinary, doctoral study program in the growing field of quantum information science (QIS). The new graduate training program, called Interdisciplinary Quantum Information Science and Engineering (iQuISE), will seek to nurture a new generation of students, from education through employment, to become tomorrow's quantum information scientists and engineers. Much of modern information technology is built on the foundations of physical switching and signaling devices, algorithms, information, and control. Recently, these foundations have evolved rapidly forward, with a tremendous new influx of ideas from quantum physics, resulting in high performance quantum algorithms, emerging new capabilities for information transmission, and a nascent generation of quantum information processing devices. Because QIS has been emerging as a field to which many traditional academic disciplines contribute, the major challenge for QIS at MIT, and at similar institutions, is to provide doctoral students with a cohesive and complete experience. A primary objective of the new MIT program is to accomplish this not just in the classroom and in the laboratory, but also to enrich the experience to prepare MIT's QIS doctoral candidates for careers in academia, government and industry.

The past year was also marked by some especially sad news. On March 12, 2008, Prof. Jin-Au Kong passed away after a brief illness. Professor Kong joined the MIT faculty and RLE in 1969. He served as chairman of the Department of Electrical Engineering and Computer Science's concentration area on Energy and Electromagnetic Systems and led the RLE's Center for Electromagnetic Theory and Applications. An internationally renowned expert on electromagnetic waves, Prof. Kong earned acclaim for his work in electromagnetic wave propagation, radiation, and scattering, and their applications in microwave remote sensing, geophysical exploration, and electromagnetic transmission and coupling in microelectronic integrated circuits. More importantly, he was known for his outstanding abilities as an educator and mentor whose dedication to both undergraduate and graduate students was legendary. He will be missed.

Jeffrey H. Shapiro  
October 2008