



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 2005-2006 academic year, as well as those of our research staff and students, are described in this Progress Report.

This current vitality of the Laboratory is built on the foundation of six decades of remarkable research in RLE. This year, we begin to celebrate our sixtieth anniversary: RLE 60+. Our anniversary celebration provides not only the occasion to reflect on these achievements, but also the opportunity to strengthen our bonds of community and to enrich our shared understanding of all the exciting work in RLE that is now leading us into the future—a future, given the

excellence of RLE faculty, staff and students, that is certain to be equally remarkable as our past.

The past year witnessed many important accomplishments for the Laboratory. The Center for Integrated Photonic Systems (CIPS), an MIT virtual center that was launched with seed funding and administrative support from RLE, has continued to flourish under the leadership of CIPS Director Prof. Rajeev Ram of RLE. Its 2006 Annual Meeting attracted representatives from more than 30 photonics companies and featured plenary talks by Dr. Michael Leiby (President, Optoelectronics Industry Development Association), Professor Alan E. Willner (University of Southern California, President of the IEEE Lasers and Electro-Optics Society), and Dr. Thomas G. Giallorenzi (Head of Optical Sciences, Naval Research Laboratory). The Center for Ultracold Atoms (CUA)—an NSF sponsored joint venture of MIT and Harvard centered in RLE—received its 5-year renewal with Prof. Wolfgang Ketterle of RLE as its new Director, succeeding Prof. Daniel Kleppner who was its founding Director. Both CIPS and CUA are expected to foster new, multi-investigator research within RLE. In the case of CIPS, this is already happening within the Integrated Photonics Initiative, and for CUA this is expected in the area of quantum information processing using neutral atoms.

The 2005-2006 academic year also marked a realignment within and redesignation of one of RLE's research themes. The Laboratory's increasing presence in many areas of biology and medicine—spanning everything from neural prostheses, to microelectromechanical systems for manipulating cells and molecules, to optical biopsy instruments, to speech and hearing science, to computational biophysics—is being made more prominent by uniting these groups in a single research theme entitled Multiscale Bioengineering and Biophysics. In particular, the recent and continuing influx of new RLE faculty in this theme underscores the growing importance of RLE research at the interface of biology and engineering. I am sure that you will find the chapters describing their work to be an impressive array, and I am confident that the increased interactions will likely occur, as a result of this rearrangement, that will lead to even greater things in the future.

Finally, I must recognize the contributions of Profs. David Pritchard and Jacob White, who stepped down as Associate Directors of RLE on 30 June 2006. Their counsel and wisdom has been of great value to me, as RLE Director, and in many ways—both seen and unseen—to everyone in the Laboratory. Their successors as Associate Directors, Profs. Wolfgang Ketterle and Rajeev Ram, will, I am sure, live up to the high standards of Profs. Pritchard and White. As Directors of the CUA and CIPS, respectively, Profs. Ketterle and Ram are already playing key roles within RLE. As Associate Directors, I look forward to their helping me help RLE's faculty, students, and staff enjoy the benefits of MIT's premier research and learning environment.

Jeffrey H. Shapiro
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