The term "haptic" refers to the sense of touch, those sensations arising from biological receptors embedded in skin, muscles, tendons, and joints in response to mechanical interactions with the environment. Research has shown that touch information is essential both for perception and for motor control in everyday tasks. More recently, it has been demonstrated that touch can also be equally important for controlling remote manipulators teleoperationally and for interacting with computer models in virtual environments. A "haptic interface" is a system for mechanical interaction in such situations that measures the motions and forces generated by the human user. The interface may also act as a "haptic display", by delivering various types of mechanical feedback to the user in response. These interfaces are often evaluated for their ability to accurately create the stimulation that would be produced if the user interacted directly with a real, proximal environment.

The development of effective haptic interfaces has proved challenging. Human limbs have many degrees of freedom, and haptic sensation includes many different kinds of stimuli over a vast dynamic range. At present, much of the research on haptic interfaces has focused on mechanisms design, with varying degrees of success. Further progress in design and evaluation of haptic interface systems will require the expertise of researchers from a number of different fields, particularly mechanical engineering, computing science, and various biological sciences (especially experimental psychology, kinesiology, human factors, and neurophysiology). We have encouraged members of these diverse and complementary communities to interact to address more effectively the broad multidisciplinary problems encountered.

In organizing this year's symposium, we again solicited contributions from across the spectrum of relevant research disciplines. Thirty papers were accepted, based on a rigorous review system: when appropriate, a paper was evaluated by both technical and biological researchers. The papers have been divided into five sessions (4 for oral papers and 1 for posters), which address aspects pertaining to human factors, haptic rendering, interface design and control. In addition, we have added a new panel discussion on "Critical issues in Haptic Interface Development" to raise and discuss what participants consider to be the most important challenges for this field.

We would like to thank the authors for providing the excellent papers that appear in the following pages. We would also like to thank the anonymous reviewers, who provided remarkably careful and thoughtful comments, and the Robotics Technical Panel of the ASME Dynamic Systems and Control Division, who sponsored this Symposium.