The Technical Committee on Haptics

By Hong Z. Tan

The word *haptics* refers to sensing and manipulation through the sense of touch. (In the interest of space and readability, I have taken the liberty of using definitions that have been developed by many haptics researchers. Proper citations, including a more personal account of the first year of the Technical Committee on Haptics, can be found at www.worldhaptics.org under "archives.") The term *cutaneous* or *tactile sense* refers to the awareness of stimulation of the outer surface of the body mediated by mechanoreceptors in the skin. The term *kinesthesis* or *proprioception* denotes the awareness of joint-angle positions and muscle tensions mediated by sensory organs embedded in the muscles and joints. Modern haptics is concerned with the science, technology, and applications associated with the information acquisition and object manipulation through touch, including all aspects of manual exploration and manipulation by humans, machines, and the interactions between the two, performed in real, virtual, teleoperated, or networked environments. The technical scope of the Technical Committee on Haptics (TCH) embraces all aspects related to haptic interactions, from basic science to technological developments to applications.

Earlier, haptics research focused on sensory substitution that conveyed imagery or speech information to individuals with visual or auditory impairments via their sense of touch. Typical devices used solenoid and piezoelectric actuators and electrical stimulators. With the advent of force-feedback technology, there were renewed interests in using haptic interfaces in teleoperator systems and virtual environments. Research on robotic hands and manual grasping further underscored the need for spatially distributed force sensing and display. Although the technologies for vibrotactile stimulators and point-based force-feedback devices are relatively mature and available commercially, finger-tip haptics, the development of devices consisting of tightly packed pin arrays and those conveying surface curvature, contact friction, and slip, is now a topic of hot pursuit in many research laboratories. In the recent years, haptics has permeated our daily lives by showing up in consumer products such as personal digital assistants, game consoles, cell phones, and touch screens.

The TCH was established in October 2006 under the IEEE Robotics and Automation Society (RAS) and is cosponsored by the IEEE Computer Society. The mission of the TCH is to integrate the diverse interests of the highly interdisciplinary research community and to improve communication among the different research areas. Haptics research by its nature is highly multidisciplinary and interdisciplinary and covers many fields such as robotics, control, neuroscience, psychology, rendering, algorithms, interaction design, multimodal, and multisensory research, to name just a few. Major breakthroughs can be anticipated through the integration and crossfertilization of different disciplines. The TCH serves the haptics community by coordinating the scheduling of major haptics conferences, facilitating special conference sessions, workshops, and tutorials, organizing special journal issues on haptics, and contributing toward a journal on haptics.

The TCH is our latest attempt at building a home for the international haptics research community. Following several workshops and conference sessions in the early 1990s, Ed Colgate and Dov Adelstein started the first Haptics Symposium in 1992. In 1996, Ken Salisbury and Mandayam Srinivasan organized the first PHANToM User's Group Workshop following the commercialization of the PHANToM series of force-feedback devices, which have since become the PUMA for haptics research. The EuroHaptics Conference was founded by Alan Wing and Matthias Harders, and its first meeting was held in 2001. In March 2005, Massimo Bergamasco and Antonio Bicchi successfully hosted the first World Haptics Conference (WHC) in Pisa, Italy, which brought together almost 400 haptics researchers from all over the world. To leverage the momentum generated by the first WHC, Antonio Bicchi proposed the idea of launching a TCH in October 2005. Discussions with top haptics researchers ensued over e-mail, and the pros and cons of being associated with the IEEE were debated. A common theme at these discussions was the need for TCH to be inclusive to reflect the diversity of haptics researchers. As far as I am aware, the TCH is the first to have joint sponsorship from two IEEE societies.

Among our many accomplishments in the first year, we received the RAS Most Active Technical Committee of the Year Award in 2007 and have successfully launched the *IEEE Transactions on Haptics* for 2008. Needless to say, the success of TCH has been a group effort. I have been ably assisted by my cochairs, members of the executive committee, and our senior advisors. Of the RAS leadership, Dick Volz has been a great president, who has often made the impossible happen. Ken Goldberg and Stephanie White (then vice president of Technical Activities, Computer Society) have guided us with great openness. We are also thrilled to be working with the new RAS President Bruno Siciliano, who has been very supportive of TCH.

To learn more about TCH and to join us as a member, please visit our Web site at www.worldhaptics.org. Information about all RAS technical committees is at http://tab.ieee-ras.org/.

Digital Object Identifier 10.1109/M-RA.2008.916107