The emergence of large displays holds the promise of basking us in rich and dynamic visual landscapes of information, art, and entertainment. How will our viewing and interaction experiences change when large displays are introduced in our workplace, home, and commercial settings? What technology is needed to implement this vision? This special issue on large displays attempts to provide a sample of the research being conducted in this domain.

Five years ago, *IEEE Computer Graphics and Applications* published a special issue on large-format displays edited by Thomas Funkhouser and Kai Li (vol. 20, no. 4). They showcased a number of research efforts focused on overcoming the challenges of constructing large-display systems. Today, some of the same challenges still exist but technology advances have consumed a significant portion of the challenges.

In terms of constructing large, high-resolution displays, the affordable solution still remains to tile an array of projectors together to simulate one uniform display space. While this has become more affordable as projectors have become less expensive, the overall cost of constructing and maintaining these arrayed projectors is still high. Each of these projectors often needs to be driven by a dedicated PC and must be adjusted and positioned to simulate one contiguous display space. Maintaining the collection of networked PCs also incurs a cost. In addition, specialized software must be designed to orchestrate a unified image across multiple PCs and projectors. See the article by Wallace et al. in this issue for a description of the state of the art in building large-display systems.

User interfaces for large displays need some sort of input system so the user can interact with the display. In this domain, input technologies continue to lag behind display output. Few solutions have been designed and even fewer commercial solutions are available. Input systems that allow “pen-on-whiteboard” styles of interaction remain elusive. Some input devices can handle a large-display space of, say, 6 x 8 feet but lack pressure sensitivity. Rich, multihanded, and multi-user input remains in the research realm. In this issue, Morrison describes a state-of-the-art commercial system for large-display input.

Research on large horizontal displays is also quite active. This configuration is well suited for collaborative activities and has the additional challenge of dealing with the viewing orientation of the information. For example, two people sitting across from one another often must view data by other users that is upside down or at a strange viewing angle (see the article by Scott, Carpendale, and Habelski).

While many challenges remain for large-display systems, such as high cost, setup, and maintenance, we believe the future remains promising as other industry forces push the large-display evolution. For example, the high-definition TV format becoming more readily adopted by industry is promising. The 1,920 x 1,080 HD resolution will put pressure on individual displays and projectors to increase in resolution while, ultimately,
becoming more affordable. Apple’s 30-inch Cinema display boasts a 2,560 × 1,600 resolution. It does indeed feel like a large display when you are sitting in front of it. More recently, Sony introduced the SXRD 4K digital projector with a native resolution of 4,096 × 2,160 (see http://www.sony.com/sxrd). This allows you to project a high-resolution image up to a maximum of 70 feet wide. More important than affordability, this type of HD projector might be an industry-shifting disruptive technology in that it offers an order of magnitude change compared to an array of projectors. For example, in a 4 × 3 array of 1,024 × 768 projectors, you need 12 projectors. However, you only need one 4K projector for the same array, plus you get uniform color and illumination across the frame.

Independent of any specific technology, it is these types of advancements in conjunction with new applications that will continue to fuel the emergence of large displays as ubiquitous technology. Ah, the future is indeed large and bright.

Gordon Kurtenbach is the director of the Interactive Graphics Research Group at Alias. The group’s focus is on 3D interactive graphics with research in the areas of input technologies, manipulation, modeling, animation, and rendering. Kurtenbach has a PhD from the University of Toronto in computer science. Contact him at gkurtenbach@alias.com.

George Fitzmaurice is a senior research scientist at Alias and an adjunct assistant professor at the University of Toronto. His research focuses on innovative interaction techniques, interfaces for next-generation displays, input technologies, and graspable/tangible user interfaces. Fitzmaurice received a BSc in mathematics with computer science from the Massachusetts Institute of Technology, an MSc in computer science from Brown University, and a PhD in computer science from the University of Toronto. Contact him at gfitzmaurice@alias.com.