NEWS

News Releases
Feature Articles
Research Spotlights
Beckman in the News
Office of External Relations
Beckman News RSS Feed
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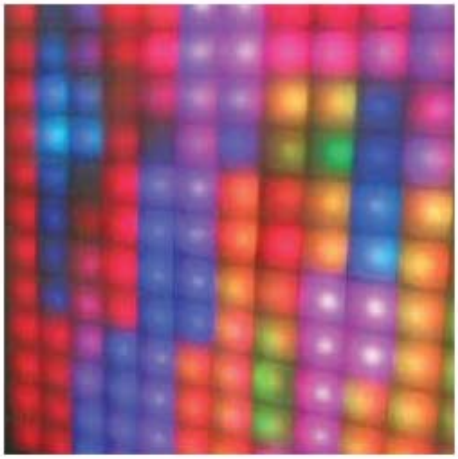
A Synthesis Between Architecture and Electronics on Display in the Beckman Atrium



To some the colorful, eye-catching big screen displays that will be appearing in the atrium this fall may seem like a case of art meeting technology, but the wall-sized screens are first and foremost real-world examples of what can result from research that takes place at the Beckman Institute.

Built by the Rogers Research Group, the LED and PDLC Walls are visually compelling, but they were developed as proof-of-concept prototypes of the type of technology coming out of the group's research work. Group head John Rogers, a member of the 3-D Micro and Nanosystems group and a Department of Materials Science and Engineering Professor, has been a pioneer in many areas of materials research, including flexible displays and electronics.

The LED wall, which is now on display in the Beckman Institute atrium, is both leading edge in terms of visual display technology with its "smart wall" capabilities and practical thanks to scalable material and fabrication techniques. Each of the 192 squares on the wall is a pixel cell containing a set of three LEDs (Light Emitting Diodes), one for each of the three primary colors (red, green, and blue).

Independent intensity control of each diode provides precise color mixing while the portability and stability of the structure gives it flexibility in pixel color assignment, allowing users to pick the color or patterns that best suit their room. This "digital wallpaper" can easily change colors, patterns, or images to create a diverse and unique living environment.

The LED Wall project is a collaboration between Rogers and Osman Ataman of the Department of Architecture.

This PDLC (polymer-dispersed liquid crystals) wall, which will be on display later this month, features transparency capabilities that are a huge step forward in display technology. The PDLC wall user can control each pixel independently, pixel by pixel, giving them the ability to quickly and easily change self-defined areas from transparent to "frosted" to best suit their environment.

The PDLC wall consists of 192 PDLC (polymer-dispersed liquid crystals) films in each pixel, with a relay switch in the control board that applies an AC signal to the wall. The liquid crystal elements are then re-oriented by the electric field, making the film transparent. The wall becomes opaque when the field is off because of the randomly distributed liquid crystal.

Due to the their unique behavior, the polymer-dispersed liquid crystals hold great potential for electro-optic applications such as electronic displays on mobile phones, light shutters, and for multimedia broadcasting.

The PDLC wall is also a collaboration between Rogers and Ataman.