



WALLENBERG HALL'S MISSION CONTROL

Stanford University provides engaging learning experience.

BY DAN NELSON, CTS-D, RCDD

Stanford University in Stanford CA is home to some of America's brightest young minds in the fields of engineering, computer and biological sciences, and many other disciplines. Stanford faculty and administrators are constantly seeking creative new ways to enable a more interactive and engaging learning experience inside the classroom, including making more contemporary media tools available to faculty and students.

Dedicated Facility

The Stanford campus's Wallenberg Hall is a dedicated facility for resource-rich learning spaces with the flexibility to handle more interactive and experimental types of teaching. The classrooms have been designed specifically for instruction in the context of up-to-date information and media technologies.

As part of bringing leading edge instructional technologies to Stanford, the Wallenberg Hall classrooms have now been designed and outfitted with wall display technologies in the same style of command and control center information display used at NASA Mission Control and other public sector agencies that require real-time updating and intelligence-gathering capabilities.

Wallenberg Hall, a 112-year-old building, was refurbished from 1999 to 2002, with the goal of being a "working laboratory" for advanced learning tools and technologies. As part of the redevelopment, the Wallenberg Hall Learning Theater was outfitted with three Christie projectors, each with a resolution of 1600x1200. The projectors could each display one input at a time, for a total of three individual

simultaneous displays.

Although this was considered state-of-the-art-technology at the time, in recent years, interactive display screen technology has advanced far beyond what was possible in 1999. In 2012, the Wallenberg Foundation decided to sponsor an update to the Learning Theater's technology to expand the possibilities of interactive classroom instruction. The Learning Theater was to be outfitted with a Christie MicroTiles high-resolution 32-foot-wide by 8-foot-high display wall, architected by staff in Stanford's Office of the Registrar. It is controlled by Jupiter's Fusion Catalyst 4000.

Unique Expectations

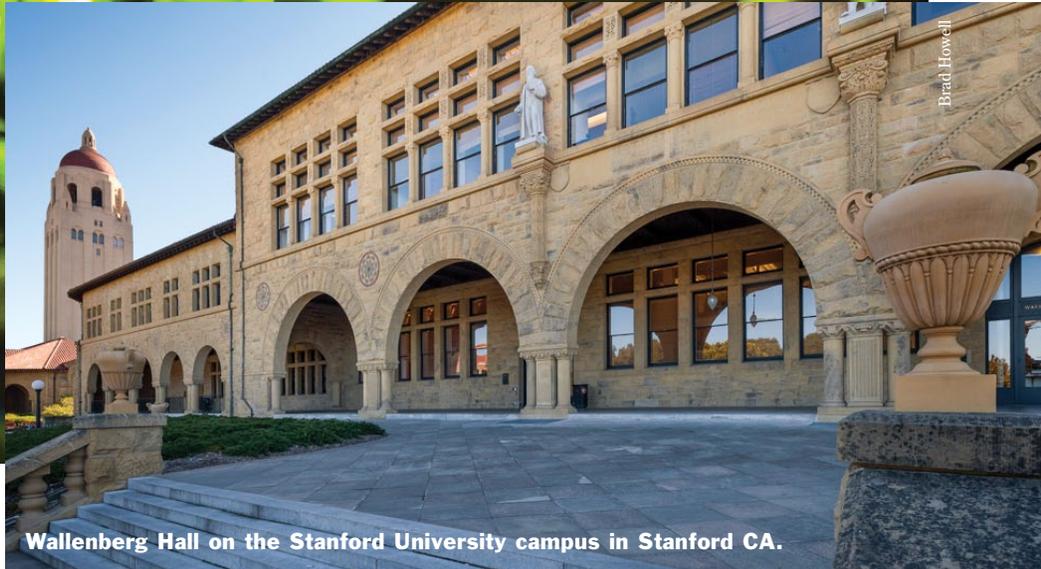
Sound Image was the systems integration and design company selected for the installation project. The Wallenberg Hall project had unique expectations for the user interface. The Registrar staff had designed the initial interface. They wanted the display screen controls to be fluid and dynamic like a wall-sized iPad. Everything had to be easy and intuitive, so anyone could walk up, touch the control screen, and quickly figure out how to use the control panel and how to interact with the information display.

Programmer Paul Ruden did a good job of enhancing the user interface. The AMX touchpanel just happens to be about the same aspect ratio as the wall. According to Robert Emery Smith, Director, Technology Services, Office of the Registrar, Wallenberg Hall, "We wanted an interface that is pretty much intuitive and self-service. Faculty can be a bit intimidated at first by the new technology, but they leave saying that was easy."

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Brad Howell



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Wallenberg Hall on the Stanford University campus in Stanford CA.

Another challenge was the variety of research being done at Wallenberg Hall, everything from physics to computer science to art history. Stanford required a versatile, scalable solution that could adapt as the technology continues to evolve.

The backend of the system had to be able to track all the coordinates in multi-dimension array in the AMX control system, plus provide the localization of sound. For example, if a classroom presentation had to set up a Skype conference call with three or four people in Tokyo, Ireland and Boston, the sound of each person's voice had to follow the individual where they are positioned on the large wall. Also, Stanford wanted to use the large screen for gaze studies, eye-tracking research, that determines where people are looking when there is so much information on the wall. So the new room needed to be able to cover all disciplines of research, and the back-end system had to have a solid backbone infrastructure that would be able to support technology that may not even be available yet. Because we are tracking all the Jupiter window coordinates, touchpanel coordinates and the audio coordinates, we can output that from the AMX controller for the researchers to use.



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Students take advantage of today's technology at Stanford University's Wallenberg Hall Learning Theater.

Installing the new display wall in the Learning Theater proved to be challenging on various levels, especially because the walls are not squared. Also, they needed to facilitate sightlines in the room in the extended space when the flanking classrooms are joined to the Learning Theater, and because a person presenting close to the wall wouldn't be able to see what was displayed with a

different geometry. Not only was this an exceptionally large display wall, but Sound Image was also installing it onto a curved wall. To do this, the company worked with rp Visual Solutions [<http://rpvisuals.com>], which has experience in mounting MicroTiles on a curved wall, to assemble and reassemble the wall multiple times until the tiles fit.

The project was on a tight timeframe



The room's videowall can be configured in multiple ways.



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Major Components

AMX NetLinX integrated controller for large rooms, N-3100 controller, MXD-2000XL-PAN and TPC-APPLE iPad

Christie MicroTiles, 720x540 native resolution per tile

Jupiter Fusion Catalyst 4000 with 16 input x 34 output configuration

LaunchPort iPad enclosure/inductive charger/magnetic wall mount, touchpanel control software to echo the big AMX interface on the handheld device

NEC MultiSync V651TM (MultiTouch) 65" displays

Panasonic BB-HCM580A PTZ network camera

Peavy MediaMatrix NION nE processor

Camera control software to manage the PTZ Security Camera

because the new display wall had to be up in time for the new semester of classes. Sound Image had originally planned for a month of testing, but was given only two days of testing due to unrelated construction delays. Fortunately, the company used a lot of components that were mostly off-the-shelf, such as Christie MicroTiles, the AMX control system and the Jupiter Catalyst 4000. Both Sound Image and Stanford worked with Jupiter and Christie to test everything, from the cooling to the DVI extenders, while the general contractor remodeled the room.

With the new installation, the display wall gives the ability to put up information from 16 different sources simultaneously (compared to the old arrangement's three individual screens). The new display wall enables the instructors and students to pull together lots of different information in different media formats, from a website to a Twitter feed, to charts and graphs, and you can scale the images according to their importance.

It's an impressive display. The Christie MicroTiles give a deeper, richer, far greater range of color than what they had in that room before. I think the Jupiter Catalyst 4000 was probably the only processor that had the capability to do such a demanding and complex job. Plus, the Jupiter processor scaling capability is impressive and will serve Wallenberg Hall well as new technology evolves.

The capabilities of the new Wallenberg Hall Learning Theater display wall were put to the test on Election Night 2012, as students from the Stanford journalism program covered the re-election of President Barak Obama. Students got to experience a frenetic array of updates, exit polls and election results, scrolling in a constant feed from multiple sources. The energy in the room was similar to NASA Mission Control: The room was full of graduate and undergraduate students focused on the "command center" display wall, covered with rich media, videos, charts, graphs

and social media feeds, as well as their own website (source for KQED and the San Francisco Chronicle, among others), and the Google Analytics page for their site, where they could monitor visitors in real time. Many of the students, supervised by faculty editors, were writing news reports that would immediately be published and disseminated that night by other news media.

The Wallenberg Hall Learning Theater display wall is an ideal example of how technology can be integrated into new ways of learning for a wide variety of subjects and academic levels. The display wall enables real-time updates, connectivity and communication worldwide, and a multidisciplinary approach to learning.

Suits The Mission

The new display wall is ideally suited to the mission of the facility, according to Wallenberg Hall's Smith, because it gives faculty flexibility to teach the way they want to teach. "There is a difference in how professors teach with technology," said Smith. "How you teach and incorporate technology is an entirely unique thing for you as a teacher, based on your experiences and preferences. There is not one way to teach with technology. So, instead, we've looked for ways to use media and modern information technology tools to enhance and reinforce the professor's own teaching style." ■