Collaborative venture produces versatile open laboratory

The Project: The Eli and Edythe L. Broad Institute of MIT and Harvard (Seven Cambridge Center), Cambridge, Mass. Seven-story research building encompassing 230,000 ft² of space plus mechanical penthouse. Budget information withheld.

This project received a High Honors citation in the 2007 Lab of the Year competition for its overall quality, particularly in its sensitivity to client objectives and its ability to excel as a lab within an urban, developer-owned facility context.

The Team: Boston Properties, Boston (owner/developer); Massachusetts Institute of Technology Investment Management Co., Cambridge (tenant representative); Elkus Manfredi Architects, Boston (architect for core/shell and lab fit-out); AHSC McLellan Copenhagen, San Francisco (lab consultant); Wilson Architects, Boston (programmer); Maryann Thompson Architects, Cambridge, and Signer Harris Architects, Boston (conceptual/schematic interior design); Bard, Rao + Athanas Consulting Engineers, Watertown, Mass. (MEP/FP engineering); McNamara/ Salvia, Boston (structural engineering); Allen & Major Associates Inc., Woburn, Mass. (civil engineering); LAM Partners, Cambridge (lighting design); Pressley Associates, Cambridge (landscape architecture); John Moriarty & Associates, Winchester, Mass. (construction management).

The Users: The Broad Institute is a collaboration of MIT, Harvard Univ. and its affiliated hospitals, and the Whitehead Institute for Biomedical Research. MIT acts as the host institution in the real estate development partnership. The focus is applying the power of genomics to medicine, and the facility now accommodates all programs of the Broad Institute in Cambridge except for the Genome Sequencing platform, which remains in its former facility. Occupancy: ~600.

The Schedule: Design commenced in spring 2004; construction started in summer 2004 (fast-track); occupied February 2006.

The Goals: The interdisciplinary Broad Institute sought new space for expansion and upgrades of current facilities, and selected one of the final development plots available in the Kendall Square mixed-use neighborhood. The site is adjacent to the cooperating Whitehead Institute façade is composed of two wall types: a grid wall of precast concrete panels punctuated by unit windows, and large “glass box” window elements. Photo: Anton Grassl/Esto. Click to enlarge.

The open stair to a mezzanine-level meeting room adds drama to the light-filled lobby. The space features configurable lighting, under-floor data and power cabling, radiant heating, automatic window blinds, and glass wall panels that can be opened to integrate the lobby with the surrounding exterior plaza. Photo: Anton Grassl/Esto. Click to enlarge.
Institute and across from the MIT campus. The opportunity to adapt an existing office core-and-shell design with specific scientific features in the fit-out appealed to the client, which had three primary objectives:

- Create an open, transparent lab to facilitate cross-pollination of scientific disciplines.
- Build in flexibility and adaptability to make the building useful over an extended time.
- Provide an environment that would stimulate great ideas.

Additional goals included the creation of public space suitable for hosting scientific meetings; preservation of a design that would allow long-term adaptive reuse (including as a non-science facility); and sustainability.

**The Solutions:** A “glass box” concept, featuring dramatic bands of windows at the southwestern corner, reinforced what Broad Institute founder Eric Lander calls “the transparency of discovery.” In general, the building’s open labs are placed within this “glass box” at the southern and western perimeter, with support space at the core. Closed special-purpose labs and related support are situated on the northern side of the facility.
An office and collaboration zone occupies the eastern side of the building, and is accessible to the rest of each floor via a racetrack corridor ringing the core. The corridor is punctuated by safety stations and support zones and has interior windows and glazed doors wherever possible, minimizing the amount of precious floor space devoted to “corridor-only” use.

On the first floor, an expansive lobby houses a museum, a 300-seat auditorium, and an oval conference facility that can be connected to leaseable restaurant space that surrounds it on the building’s east side. The front of the auditorium consists of a sizable flat-floor zone that provides space for additional chairs, or can be closed off entirely from the raised seating tiers for lectures or training in a more intimate setting. The lobby’s glass wall panels can be opened to exterior plaza space on the west and south sides of the building, providing full integration with the outdoors as desired.

The non-public side of the main floor, at the north, includes a loading dock, chemical storage room, biological and radioactive hazardous waste rooms, an acid neutralization system, and the RODI water system.

A grand staircase leads to the mezzanine level, which provides access to an oval “boardroom” overlooking the lobby and museum.

The second floor is primarily a lab floor, but also has a 125-seat “program room” conference facility, an associated kitchen and lunch room, and access to an outdoor terrace garden. The garden, situated atop the loading dock on the facility’s north side, spans the space between the Broad Institute and an adjacent parking garage and provides an alternative point of entry at the second floor. It is the primary access route for faculty who are based elsewhere but drive to the institute for weekly meetings in the program room.

Floors three through six are typical lab floors and include research, support, and office space. The assortment of support spaces encompasses tissue culture labs, controlled temperature rooms, NMR rooms, an HPLC facility, a BSL-3 lab, and a “ballroom”-type robotics room. The seventh floor has a larger amount of offices and a raised-floor computer room, accommodating the administrative and information technology staff.

The core and shell building was largely designed to accommodate the Broad Institute’s specific requirements, and included some features that would have exceeded a typical core/shell design for a high-hazard lab. Notably, fire stairs were improved; a fire wall was added within the
The central walkway rings the core and connects all labs and the glass-enclosed lounges. Photo: Elkus Manfredi. Click to enlarge.

The Highlights: Maintaining transparency without hampering function is a key theme of the design. Interior glazing is abundant and is used to an unusual degree. For instance, one of the two fire-rated stairs at the building core has upgraded finishes and a full wall of special clear glass, allowing it to function as primary circulation without jeopardizing the fire rating. The scheme is intended to encourage tenants and visiting scientists to use the stairs rather than elevators for short trips, increasing the opportunities for interaction.

Similarly, a series of two-story lounges at the western end of the building, connected with open stairways, offer researchers quick access to shared support labs as well as ample opportunity for informal encounters.

Floors 2, 3, and 4 are provided with four-hr-rated area separation between the office and lab zones; lab entries that penetrate the fire separation are equipped with primary glass doors to maintain differential pressure while allowing views. These doors are paired with secondary fire-rated doors concealed in the side walls of the entries, which close in the event of an alarm to establish complete separation.

Each floor’s office zone (east side of the building) is constructed around an open team area and kitchenette, serving as a social hub for a large conference room, single and double offices, and “hoteling” areas for visiting researchers. Marker-board walls flow from the team areas into the conference rooms, encouraging conversation and problem-solving.

The open labs in the “glass box” are generic and are generally organized with write-up stations at the exterior wall. Sinks are at the interior bench ends, with an in-lab equipment zone adjacent to the racetrack corridor. The write-up stations are separated from the benches by full-height glass partitions that improve users’ sense of privacy and ownership; many users take advantage of the glass by writing formulas on them with erasable markers. In most cases, only half-height walls separate the labs from the racetrack corridor, with a full-height wall around the core support zone. This tactic adds to the impression that the corridor is functional space rather than simple circulation.

Labs are column-free and have 15 ft floor-to-floor heights, improving operational flexibility. Bench systems incorporate both fixed and movable casework; the primary bench configurations include:

- Four 8-ft fixed workstations (two on each side) with adjustable shelving and turret-mounted services, plus a pair of 6-ft mobile sections that connects to the fixed benches for electrical power and can be easily removed to accommodate large equipment.
- Fully mobile workstations with retractable wheels, with or without shelving, with services provided by overhead boom-style carriers.
- Fully fixed components with sinks at either end of a six-workstation bench, mainly used for chemistry-intensive labs between banks of fume hoods.

All benches are served by regular above-ceiling mechanical and electrical distribution. Multiple 4-in.-diameter plugs are provided in the ceiling for access to point exhaust, and can be used to hook up snorkel fittings or ductwork for Plexiglas enclosures, or drilled out to accommodate smaller tubing for equipment vent ports.

The Results: Lab of the Year judges complimented the design’s adaptability in...
particular. “The Broad Institute is a creative solution to a lab in a developer building that must be convertible back to office space,” says Richard R. Rietz, Helena, Mont. “The floorplate was set up for deep office zones, so the architect used glass walls to bring natural light into what otherwise would have been a very dark interior. As lab settings become more urbanized, we must find more creative ways of using non-lab buildings for labs, and Broad is one of the best I’ve seen.”

Erik Mollo-Christensen, Tsoi/Kobus Associates, Cambridge, Mass., noted the pleasant atmosphere created by the building’s design. “The brightness of the colors, the glass and openess between the labs and support areas, and the refinement of the public spaces were outstanding. The nature of Broad is inherently interdisciplinary, and the scientific structure dissolves academic departmental barriers and politics. The labs are mixed and based on project functions, not specific disciplines. The support and office spaces are well-integrated with the labs, and the open and glassy interiors support this.”

Broad Institute director Lander concludes, “This building embodies the principle that I think is most essential to the work of this generation, and that is openness.”

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— Julie S.
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