New Science Tower is a Complex Link to Campus Research

by: Adria Nieswand | July 11, 2007

The Univ. of Pittsburgh uses the percolation effect to build a laboratory with a new way of thinking about the process of science.

Selected for a Special Mention in R&D Magazine's 2007 Laboratory of the Year competition, the 11-story Biomedical Sciences Tower 3 (BST3), at the Univ. of Pittsburgh, Pa., has also been awarded, by other prestigious organizations, the 2006 Honor Award for Design Excellence, 2006 Building Excellence Award, and Project of the Year.

BST3 is one of the largest projects undertaken at the Univ. of Pittsburgh. The structure connects to the university's existing bioscience building (BST2) via a bridge on the sixth floor. This links to a network of tunnels which ultimately gives access to multiple buildings on the campus.

The construction of the 30,658-m2 laboratory was a joint venture between Mascaro Construction Co., L.P., Pittsburgh, Pa., and Hunt Construction Group, Indianapolis, Ind., with **Payette**, Boston, Mass., as the lead architectural firm.

Four bands, one tower

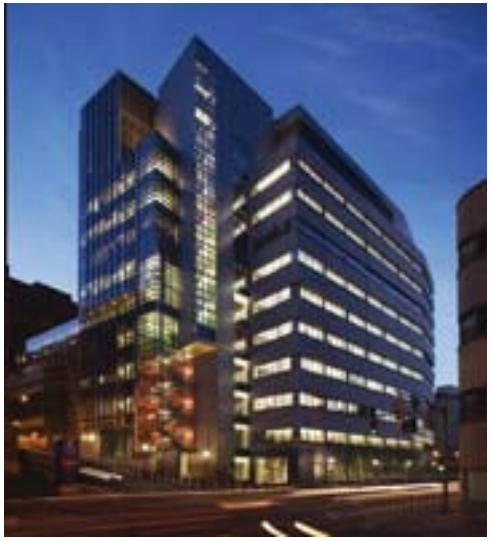
With space at a minimum and in an urban setting, the BST3 (the campus's third skyscraper) is located on a sloping, narrow site along Fifth Ave. The building was aesthetically designed using four distinct bands of materials that step up the hill. Each layer is part of the whole, yet contrasts to show its uniqueness.

The first layer—the formal face of BST3—faces south and projects a limestone canvas of planes and textures.

The second layer is a system of metal and glass, the third is a louver system, and the fourth is a limestone facade. When viewing the building from either side, it's easy to see the complexity of the layering system as the four adjacent structures step up the hill.

The sloping site changes in grade about 9 m from north to south. And even though it is 8 m below grade in the basement level, the nuclear magnetic resonance (NMR) imaging suite is immersed in natural light by stepping-back the first floor slab to allow a gap of clerestory windows along the south and west sides.

The basement level also houses, both literally and figuratively, the foundation of BST3: a cryo-electron microscopy suite (one of only a handful worldwide), and a 7 Tesla MRI suite.



*A nighttime view of the Biomedical Sciences Tower 3 along Fifth Ave. The unique color strategy—evolved from the sequential strands of mouse chromosomes—can be seen through the structure's glass exterior. Photo: **Payette***

Vital Stats

Project: Biomedical Scienes Tower III (BST3), Univ. of Pittsburgh, Pa.

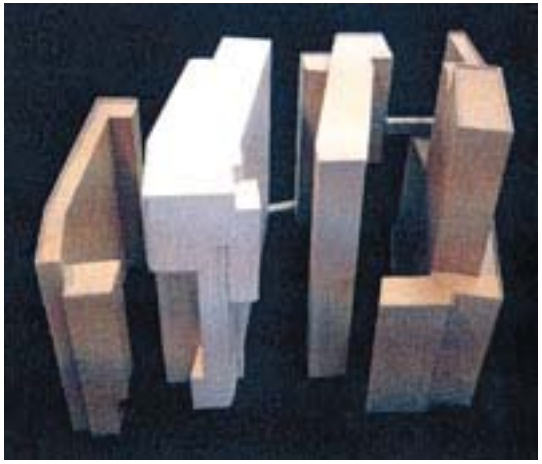
Cost: BST3 base building: $130.4 million,

RBL: $24.6 million

Completion Date: October 2005

Size: 30,658 m2

Architect/Engineer: **Payette**, Boston, Mass. (lead architecural team); JSA, Pittsburgh, Pa. (associate architectural team); Mascaro Construction Co. L.P., Pittsburgh (contractor); Hunt Construction Group, Inc., Indianapolis, Ind., (contractor); Bard, Rao + Athanas Consulting Engineers, Inc., Watertown, Mass.(principal engineer); R.M. Gensert Assoc., Pittsburgh (structural engineer); Simpson, Gumpertz & Heger, Waltham, Mass. (structural engineer)



BST3 is made up of four sections. The outer two consist of limestone which sandwich a metal and glass system and a louver system.

Working one's way up each floor of BST3, the central corridor serves to systematically bisect two distinct groups of laboratory functions: to the south, the highly flexible generic microbiology-based labs; and to the north, the more inflexible idiosyncratic programs.

Color also aids in the layout of the structure. Rather than rely on an interior designer's paint chips to configure the color strategy, color diagrams of mouse chromosomes have provided the unique color layout of the tower. By assigning sequential strands of mouse chromosomes to each floor, a different color approach was developed for each corridor. This may seem like a random approach, but it has offered a surprisingly complex pattern to each floor's identity.

The vertical stacking of the building is organized around what **Payette** calls the "percolation of ideas." Beginning in the basement—from the smallest components in structural biology—each level of the building works its way up to the top floor to the final manifestation in the drug discovery program.

This feature did not go unnoticed by R&D Laboratory of the Year judge Erik Mollo-Christensen, at Tsoi/Kobus & Associates, Cambridge, Mass. "The stacking organization is well done, with imaging at the bottom, biology labs above, the Regional Biocontainment Laboratory (RBL), drug development/ chemistry at the top, and the vertical vivarium that serves most of the lab floors directly to allow investigator access to multiple species," says Mollo-Christensen.

Flexibility is the key to creativity

The BST has an innovative plug and play system which allows researchers to adapt their environment to their research needs. Lab gases and vacuum service are fed to the bench-tops via individually keyed quick disconnects which allow services to be instantly disconnected for casework movement/ modification. Likewise, electrical and tel-data lines are connected from the ceiling service plate via twist-lock receptacles.

However, the crème-de-la-crème of this state-of-the-art facility is the Regional Biocontainment Laboratory on the eighth floor. At nearly 2,787 m2, the RBL is an island of BSL-3 and ABSL-3 Enhanced labs. The mechanical, electrical, and plumbing systems are 100% redundant to maintain operation in the event of equipment failure.

All-in-all, this building stands as a world-class facility, and according to Rich Reitz, R&D Laboratory of the Year judge, "BST3 is a harbinger of the future. We will have to pack more, disparate core facilities into our lab buildings, and make the buildings work on ever smaller pieces of land. The solution to BST3 is truly a planning gem."