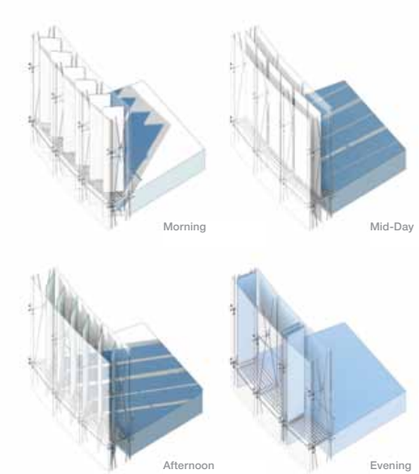

Milstein Family
Heart Center



A dynamic double curtain wall delivers energy performance and optimism for this cutting-edge medical community.

THE VIVIAN AND SEYMOUR Milstein Family Heart Center at NewYork Presbyterian Hospital is one of the world's leading pioneers of cardiac treatment. In order to maintain this edge, the institution recently built a $240 million, 125,000-square-foot addition to its 165th Street hospital complex. Seeking to provide more than just room for the latest in medical advances, the hospital leadership and key donors, including the Milsteins, wanted a building that would buoy its patients' morale—giving the gift of hope to those facing life-threatening illness. Ian Bader, the project's lead designer for architects Pei Cobb Freed & Partners, knew immediately how to deliver this kind of reassurance in the form of architecture: The site, a cramped plot at the southern edge of the hospital's upper West Side campus, overlooked a breathtaking panorama of the Hudson River and Palisades. Bader intended to bring this view to the interior, opening up the facility to the soothing effects of unfiltered daylight in the process. The problem was how to do so without also causing wild swings in temperature. His solution was to enclose the building in a four-story-high glass climate wall—a dynamic double curtain wall that tracks the diurnal course of the sun, controlling incoming daylight while keeping the hospital's occupants in immediate touch with the glory of the natural world. "Looking outwards becomes an event of hope," explains Bader. Thanks to superb thermal performance and unrivaled craftsmanship, the facade system also helped the project to earn a LEED Gold rating.

More than just an expansion of the hospital's facilities, the addition creates a new entry sequence to the Milstein Heart Center, ushering visitors in from Fort Washington Avenue along a curving passageway that opens into a naturally illuminated four-story atrium. Glass-floored bridges cross the atrium, spanning between the addition and the existing Irving Pavilion and linking directly to corridor waiting areas that abut the curving climate wall. Constructed of custom steel box beams, the bridges support a structural glazing floor system that allows daylight to pass freely through the space's water white glass curtain wall and skylight. A single, mid-span vertical cable suspended from the atrium roof above is used only to control deflections and vibrations. The bridges connect the neighboring Irving Cancer Center with the floors of the new building, facilitating continuity between medical departments.

The four-story atrium is constructed with both a glass ceiling and an approximately 45-by-70-foot glass facade. The paramount aesthetic goal was that the structural support of the atrium facade be as willowy as possible in order to leave views of the Hudson River and beyond unobstructed. An efficient single-plate steel girder system spanning between the new addition and the existing Irving Pavilion supports the atrium roof. The gravity load of the atrium wall is supported by small diameter Bright drawn stainless steel 316 S 1x19 strand cables hung from the atrium trusses above. The lateral support of the vertical wall is provided by prestressed, Vierendeel horizontal trusses, constructed of a thin plate and prestressed horizontal cable. The glazing is supported from these systems with Pilkington stainless steel glass point-support hardware.

Rising to the west of the atrium, the addition's climate wall is composed of a 22 millimeter-thick laminated glass outer wall and a 44-millimeter-thick insulated glass inner wall separated by a 3-foot cavity. The layer of air in the cavity mediates solar heat gain in warm months and acts as insulation during the winter. When outdoor temperatures rise, the building's exhaust air is drawn into the lowest level of the wall by convection currents, allowing built-up heat to rise naturally to the top elevation where it is expelled through a rooftop vent. In winter, this vent is closed off, holding in the air and creating a thermal blanket for the building.

As with the atrium, the climate wall's glass panels are composed of Pilkington Optiwhite insulated glass units, meaning that the light that comes through is unadulterated by high-performance coatings, which tend to taint the sun's full-spectrum rays. "We live in a filtered world," muses Bader. "I tried to avoid that here." The tradeoff, of course, is that the glazing offers little in the way of shading. To make up for this, Bader and his team designed a system of computer-controlled fabric louvers, essentially motorized vertical blinds that track the trajectory of the sun. In the evening, the system is completely open, at midday it is closed, and between these two extremes the panels adjust accordingly, optimizing the amount of light passing through at any given time. "Typically, a

This page and opening spread: Paul Warchol

Top left: Pei Cobb Freed & Partners; top right: Thornton Tomasetti

Above Computer-controlled louvers track sunlight throughout the day, optimizing the amount of light entering the building.
Above right Prestressed Vierendeel trusses provide the atrium's lateral support.
Facing In warm weather, the building's exhaust air is drawn through custom grating at each floor to a rooftop vent.
Opening spread The climate wall and atrium give a new face to the hospital's cutting-edge facilities.

high performance glass would have a shading coefficient of .6 to .45," says Bader. "The shading coefficient of this system is very low—.1 or .05. You would have to have a virtually opaque wall to get that." In addition to the blinds, the airspace features a stainless steel catwalk system, a custom grating supported by small-diameter pipe members integrated into the climate wall support structure, that allows easy access for maintenance.

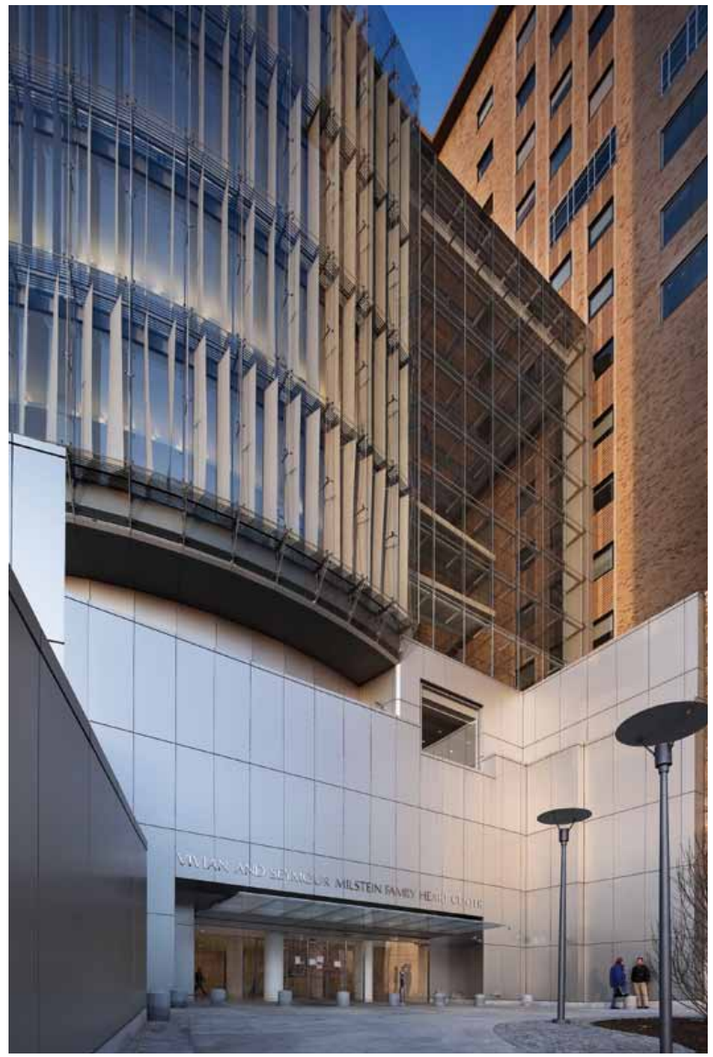
The wall's double laminated glass panels are a variety of sizes, though they are generally 5 feet wide and 16 or 17 feet high depending on floor-to-floor heights. The wall does not rely on a mullioned framing system, but upon structural glazing and custom-designed point supports. The point supports attach to a system of crisscrossing post-tensioned fine ground brush drawn 304 stainless steel rods that hang from the ceiling and are drawn down by coil springs at the wall's base. This system kept the 3/8-inch diameter rods as slim as possible, as the structures in tension require significantly less material to handle the applicable loads. Rods also tie the tensioned system back to the floor plates to absorb lateral forces, primarily wind loads. W&W Glass erected the wall with stainless steel components milled by TriPyramid Structures.

Behind its sophisticated steel and glass corset, The Milstein Family Heart Center now stands as a hopeful refuge for patients and their families, with enlarged details of Hudson River School painters' landscapes on the walls of the waiting areas and lobby imbuing a natural vibrancy and depth to the center's interior and reiterating the addition's strong ties with the natural world. Luminous between NewYork Presbyterian's older masonry structures, "All the elements of the center were carefully engineered like pieces of jewelry—each item has its own special identity and purpose," says Bader. "And while the existing buildings are not architecturally distinguished, they are of archaeological value, allowing a layering of stories to happen. The dialogue is alive and well here."■

Pei Cobb Freed & Partners

Paul Warchol

Right Because the climate wall structure is in tension, less material was required to handle applicable loads and steel rods could be a slender 3/8-inch diameter, making them nearly invisible from the exterior.
Facing page Glass point supports attached to crossed post-tensioned steel rods drawn by coil springs in the wall's base.



Milstein Family Heart Center

Location: **165th Street and Fort Washington Avenue, New York, NY**
Owner: **NewYork-Presbyterian Hospital,** *New York, NY*
Architect: **Pei Cobb Freed & Partners Architects,** *New York, NY*
Associate Architect: **daSILVA Architects,** *New York, NY*
Structural Engineer: **Thornton-Tomasetti,** *New York, NY*
Mechanical Engineer: **Syska Hennessy Group,** *New York, NY*
General Contractor: **Bovis Lend Lease,** *New York, NY*
Curtain Wall Consultant: **R.A. Heintges & Associates,** *New York, NY*
Structural Steel Erector: **Empire City Iron Works,** *Long Island City, NY*
Miscellaneous Iron Fabricator and Erector: **Post Road Iron Works,** *Greenwich, CT*
Architectural Metal Fabricator and Erector: **Post Road Iron Works,** *Greenwich, CT*
Ornamental Metal Fabricator and Erector: **Precision Glass and Metal Works Co., Inc.,** *Maspeth, NY*
Curtain Wall Erector: **W&W Glass,** *Nanuet, NY*