Lenfest Center for the Arts

Lenfest Center for the Arts (left) and Jerome L. Greene Science Center (right).

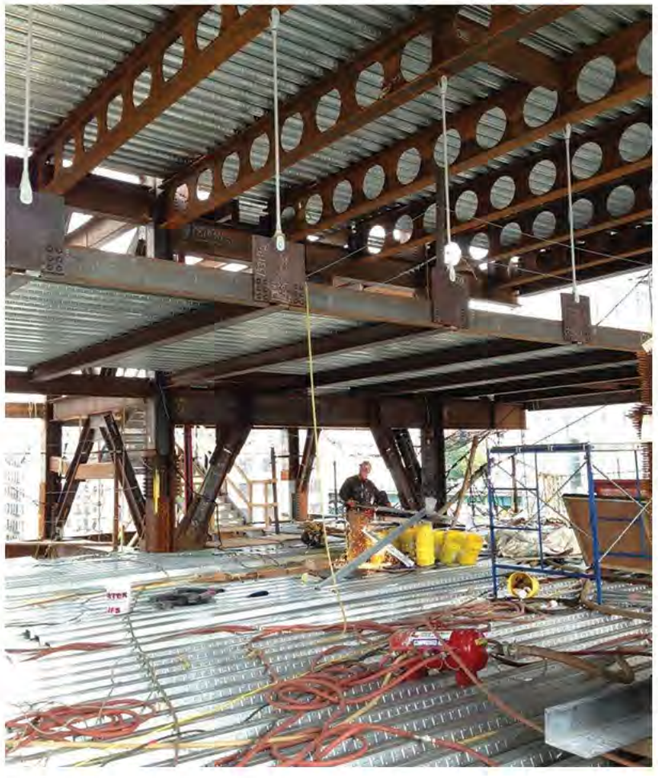
In a high-performance cultural center on Columbia University's new campus, Renzo Piano Building Workshop looks to the neighborhood's industrial tradition. Steel and aluminum make this multi-program building robust functionally and aesthetically.

COLUMBIA UNIVERSITY'S NEW CAMPUS IN Manhattanville (a.k.a. West Harlem) sits between two striking pieces of transportation infrastructure: the Henry Hudson Parkway viaduct above 12th Avenue and the Metropolitan Transit Authority's 1 line above Broadway. Their beams and arches establish a visual vocabulary for the neighborhood, both graceful and rugged. An academic complex that looks to the arts and sciences as the intellectual and economic foundation for urban reanimation, especially in this site, will naturally rely on industrial materials.

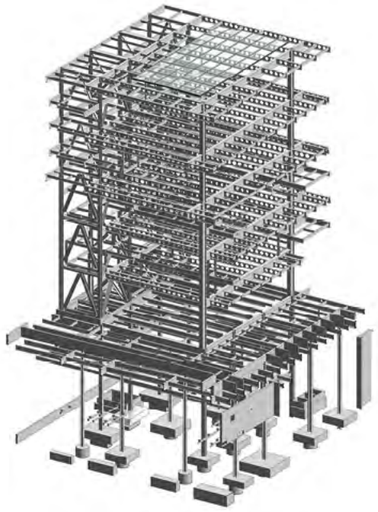
Renzo Piano Building Workshop (RPBW), long known for designs that place structural elements forthrightly in view, grounds its vision for the new Lenfest Center for the Arts in the observation, as project architect Antoine Chaaya puts it, that "steel already is part of the DNA of the site.... The soul of the place, no doubt, is industrial." Steel, proudly exposed, creates a dialogue between Lenfest and its surroundings, including the Jerome L. Greene Science Center housing the Zuckerman Mind Brain Behavior Institute (the campus's first building, opened last October) as well as the elevated structures flanking Manhattanville to the east and west. An ambitiously proportioned steel frame also helps Lenfest combine disparate activities harmoniously. Though in lesser hands a multipurpose arts complex can be a camel—a horse designed by committee, doing several things adequately-to-awkwardly and none superbly—RPBW and its collaborators (including Davis Brody Bond and Body Lawson Associates) have fine-tuned the details to make Lenfest a precision instrument for creativity, more akin to a finely crafted multifunction watch.

"The steel in this project," Chaaya says, "was really used on three different levels: first one, for the primary structure... the larger span, and then you have the secondary structure, the other beam running the smaller span, and then you have tertiary structure, where we are using this for [the] facade, for stairs, for canopies—for what we call the lace." Exterior bracing frames using cast-steel nodes and diagonal columns occupy the northwest and northeast corners, taking vertical loads transferred from the secondary members. Major members are visible both outside and inside, with architecturally exposed structural steel (AESS) protected by intumescent paint, imparting a sturdy elegance in whites and grays.

"Every member basically belongs to a surface category of steel," adds senior vice president Yoram Eilon of WSP/Parsons Brinckerhoff, "based on its location and visibility within the building," economizing on the pricey paint. "You don't treat a node that you can see from 3 feet the same way as you treat a beam that is 20 feet above you. The team categorized the steel members based on parameters such as proximity to view/touch, structural role in the primary structure, and exposure conditions in order to achieve optimum performance and economy. Selected members were categorized as AESS." The steel used on the



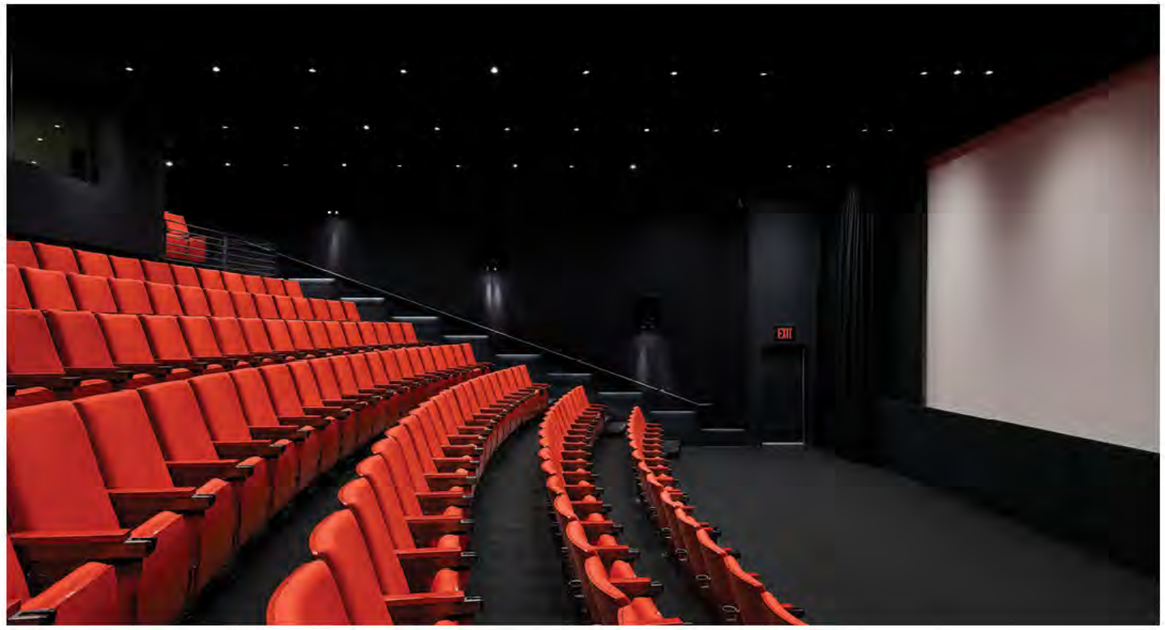
Clockwise from top right A model of Lenfest's structural steel framing. Large cellular beams running north-south retain strength with less mass and allow ducts, piping, and conduits to pass through the round openings. Lenfest under construction, looking northeast. **Facing from top** The Katharina Otto-Bernstein Screening Room. A north-south section depicting Lenfest's varied programming.



project is mostly recycled, he adds, at levels above the U.S. norm, one of many points contributing to Manhattanville's Stage 1 LEED Platinum certification under LEED for Neighborhood Development, the first LEED-ND certification in New York City.

The 60,000-square-foot building includes four distinct programs: the Katharina Otto-Bernstein Screening Room for the university's film department (seating 150, doubling the capacity of its predecessor in the Morningside campus's Dodge Hall); a black-box performance space for theater and dance; the Miriam and Ira Wallach Art Gallery; and a flexible presentation space for lectures, symposia, recitals, and other gatherings ("the Lantern"). "The structural framing concept for all the floors is similar," reports Eilon, "even though we were challenged to accommodate different performance criteria.... Meeting these criteria from a structural perspective required state-of-the-art dynamic analysis simulating the anticipated use characteristics. This was particularly important due to the framing of the long spans that made the open space possible." Each component occupies a double-height volume and requires broad column-free expanses: 72 feet of uninterrupted east-to-west space between corner columns that contribute to a moment frame stabilizing the southern portion of the building, with the elevator core offset to the north to maximize open floor areas. Floorplates vary as the building rises: the top-story Lantern measures 96 feet east to west and 54 feet north to south, Eilon continues, including nearly 12 feet of cantilever with a 72-foot girder spanning between the anchor columns. He describes the eight-story reverse-setback building as "unusual from the structural perspective... From a total area perspective, it's a compact building. At the same time, it's one of the more challenging buildings I've worked on because of [its] highly integrated systems design approach and the unique design criteria."

Opening spread: photo © Columbia University/Victoria Benitez; this page, clockwise from top: © RPBW; © Columbia University; © Columbia University/Frank Oudeman; diagram: © RPBW



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The four spaces each represent a variation on the theme of large chambers served by mezzanines (providing public entry and technical booths in the cinema, balcony seating and back-of-house facilities in the black-box theater, offices for the gallery, and the mechanical floor above the Lantern). What makes the long spans possible without significant structural deflection is the secondary or north-south component: large cellular beams, a form of castellated beam with round perforations rather than hexagonal openings, retaining strength with less mass and allowing ducts, piping, and conduits to pass through the round openings. "The highest beam, which is running east-west," Chaaya notes, "is where we have the 72-foot span; it's three foot seven deep. Imagine if this needed to be in concrete.... We are giving to the beams the structural inertia that they need, but the beam does not need to be completely full in the middle." All the columns use wide-flange sections; some are also plated. Cellular beams are exposed brightly in the Lantern beneath louvered skylights and in the Wallach Gallery's uniformly white ceiling amid ducting and lighting, resembling the downtown industrial lofts where "the contemporary arts were born." In the screening room and the black-box performance space's technical-grid ceiling, the beams are darkened as the programs require, but still visible.

Sonic and vibrational isolation must meet high standards here. Chaaya describes a scenario where a meeting or musical event in the Lantern coincides with an opening in the gallery, as cocktail glasses clink and stiletto heels clack on the floor; dancers leap in the black box below, their landings cushioned by spring-loaded raised flooring, viewed by an audience in mezzanine seating suspended by steel rods from the slab above; and students in the second-floor screening room examine a film, requiring quiet acoustics and an unwobbling projector. Up to 900

people may thus be using Lenfest's facilities at the same time, each group needing different conditions. "The floor framing is composed of... cellular beams with composite galvanized metal deck on top," says project manager Frank Mannino of WSP. "The concrete topping slab is supported by the metal deck. Headed studs are welded to the steel beams and anchored to the concrete slab." An additional benefit of steel, Chaaya notes, is that it allowed top-down construction, moving down a story at a time rather than beginning with full basement excavation. "If we are not using the steel," he says, "we will not be able to use this technique, which allows us to gain more or less one year on schedule, and one year of schedule is a lot of money."

"Is this an ideal structure?" Eilon asks rhetorically. "Obviously not, but it's a very functional structure." An engineer's ideal structure, he says, is "quite boring, by the way. It wants to have a square perimeter, a core in the center as big as possible, and then... open space all around for functions. Obviously that type of structure is not applicable here, and I think that the Lenfest building responds to the architectural vision. That's the point of it. It integrates all of the building trades' efforts into a dynamic and iconic structure. You can see that this building was designed by an architect and not a structural engineer—which is actually a compliment." Although Lenfest is modest in size compared to WSP's overall work within the Manhattanville campus, adds executive vice president Jeffrey Smilow, the firm is particularly proud of its success in meeting the challenges of the jewel-like building.

Lenfest's facade is a naturally ventilated double skin of white-painted aluminum paneling (3-foot modules 6 mm thick to avoid deflection, Chaaya notes, or 4 mm in certain panels supported from behind), adding thermal efficiency in both summer and winter by serving as a rain screen and letting air circulate between the building body and the aluminum panels. The building avoids a shipping-container ambience by giving three of the four chambers large-scale fenestration and precisely controllable daylighting, the screening room being the logical exception. Broad, striking views from the Lantern, the gallery, and the black box (when its blackout shades are opened) look south across a small piazza toward Columbia's main Morningside Heights campus a few blocks away. As its ground-floor lobby is fully transparent except for the core, Lenfest appears to hover above grade, maintaining the civic permeability that defines RPBW's master plan for Manhattanville—a quality also shared with Lenfest's larger, better-known downtown counterpart, the Whitney Museum. "This is the first similarity between the projects," Chaaya says, "because we deeply believe that the building should not take possession of the ground floor. This is not only an urban attitude, it's also a human attitude and a civilized attitude... The ground floor is shared with the city; it's shared with the community. You welcome people, and you are open to the city."

Expansion into Manhattanville addresses Columbia's chronic spatial constraints (a particularly acute form of the challenge all urban universities face, finding lateral annexation impossible or prohibitively costly) while reinvigorating a district that had fallen on hard times. The university's full formal title, not always recognized outside its walls, is Columbia University in the City of New York. That relationship has always been too complex for binary terms like "town/gown" to describe. Lenfest represents a once-insular Ivy League institution's optimistic embrace of urban muscularity, a celebration of how infrastructure and expressivity are inseparable.

Above The Miriam and Ira D. Wallach Art Gallery.
Facing Flexible performance and presentation spaces will showcase thesis productions and support innovation in the performing arts while hosting a variety of public programs and events.

LENFEST CENTER FOR THE ARTS

Location: **Columbia University Manhattanville Campus, New York, NY**
Owner/Developer: **Manhattanville Development Group for Columbia University Facilities and Operations**, *New York, NY*
Design Architect: **Renzo Piano Building Workshop**, *New York, NY*
Architect of Record: **Davis Brody Bond LLP**, *New York, NY*
Associate Architect: **Body Lawson Associates**, *New York, NY*
Structural Engineer: **WSP/Parsons Brinckerhoff**, *New York, NY*
Mechanical Engineer: **Jaros Baum & Bolles**, *New York, NY*
Lighting, Acoustical and Vibration Consultant: **Arup**, *New York, NY*
Construction Manager: **Lendlease US Construction**, *New York, NY*
Structural Steel Fabricator: **Cives Steel Company, Northern Division**, *Gouverneur, NY*
Structural Steel and Metal Deck Erector: **J.F. Stearns, Co., LLC**, *Pembroke, MA*
Miscellaneous Iron Fabricator and Erector: **Westchester Metal Works**, *Yonkers, NY*
Curtain Wall Fabricator: **Josef Gartner USA** (a division of **Permasteelisa North America**), *Chicago, IL*
Curtain Wall Erector: **Tower Installation, LLC**, *Windsor, CT*