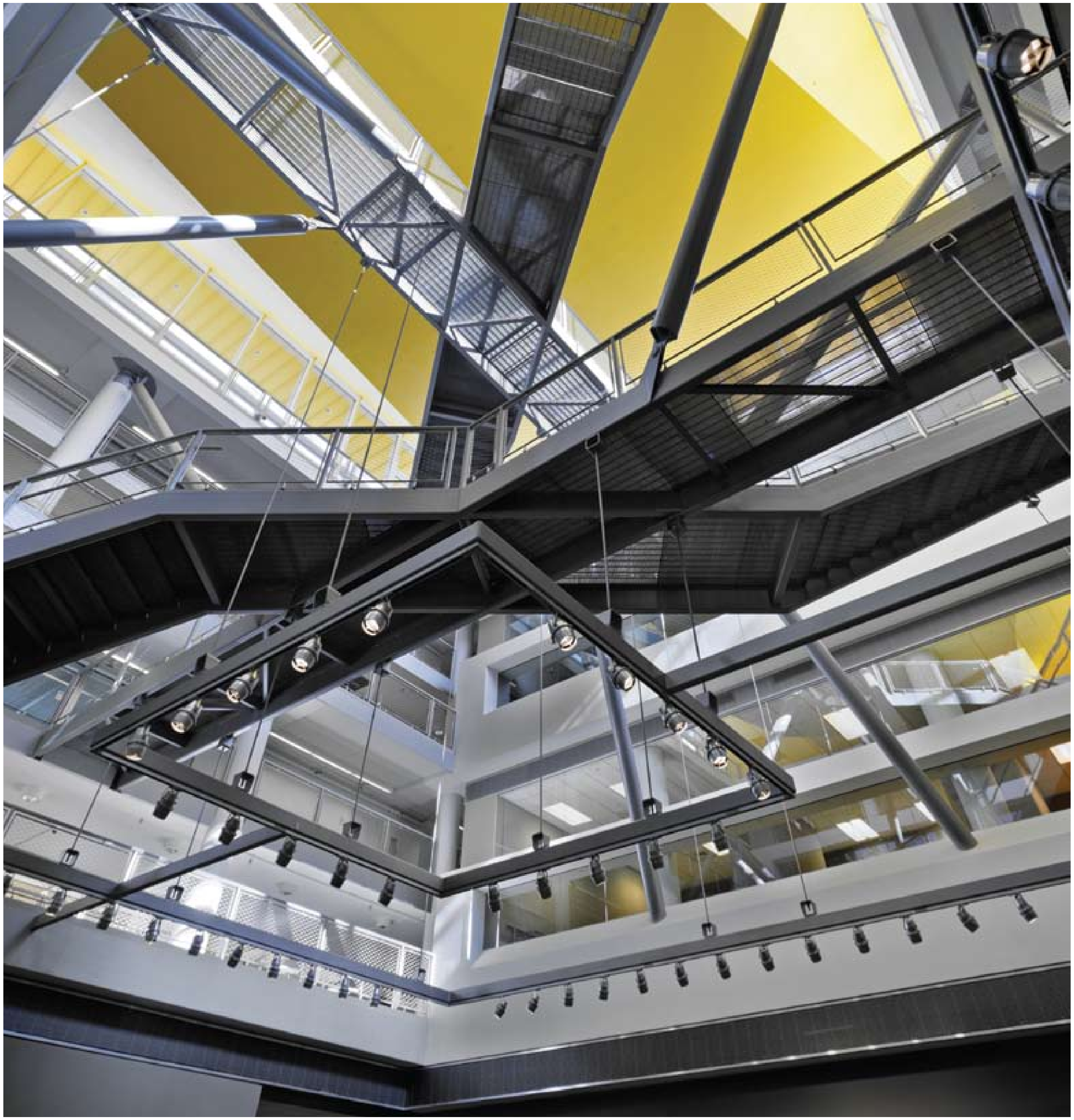


City College of New York School of Architecture

A feat of bridge-and-stair engineering brings new life to an aging campus building.

WHEN RAFAEL VIÑOLY ARCHITECTS DECIDED to hollow out the central core of what was to become the new Bernard and Anne Spitzer School of Architecture for CUNY's City College of New York, it was to create an atrium that dramatically opened up the interior of the five-story former library building. But the decision also left them with a new design challenge: The building's core had housed much of its circulation system, and now visitors would need to travel to the far corners of each floor just to reach a stairway.

Viñoly's elegant solution was to construct a new circulation system entailing interconnected bridges and stairways that traverse the atrium of the school in a dizzying Piranesi-esque vista, linking alternating levels and opposite sides of each floor. A pair of bridges forms the system's backbone, one 75-foot span connecting the east and west ends of the third floor, and one 120-foot span connecting the north and south ends of the fifth floor. Intersecting each bridge diagonally is a stairway, one passing through the lower bridge to connect the second and fourth floors; the other passing through the upper bridge to connect the fourth floor and the roof.

A variety of materials add to the striking effect of the airy configuration. The bridge and stair railings are made of a lightweight, flexible ASTM A36 stainless steel mesh with 2-inch-square openings. "It's almost like stocking material," says Viñoly project director Fred Wilmers. The bridge deck and stair treads are fabricated from inch-thick ASTM A36 galvanized steel grating, with closely spaced ¾-inch openings. The grating yields a view of the atrium below from the vantage point of someone standing on the bridge, but appears opaque from every other angle. Bridges and stairs alike are painted with a high-performance, silver polyurethane paint.

To create the circulation system, the architects removed the building's core, by cutting large openings in the centers of existing floor slabs. They then constructed new mezzanines at the perimeter walls, sandwiched between the existing floors to accommodate the new circulation pattern. Prefabricated sections of the two bridges were hoisted up via a pulley and cable system and hung from freestanding gantries, then the bridge sections were welded together in place and connected to the perimeter floor slabs, stairways, and other reinforcements.

According to Tian-Fang Jing, a principal at Weidlinger Associates, the engineering firm that partnered with Viñoly to design the school, the upper bridge's extreme length necessitated a complex system of supports. Four sets of hangers—Type 304 stainless steel rods ¾ inch in diameter—extend downward from the roof slab and connect to the upper bridge at points 18 and 36 feet in from each of the northern and southern walls. Another set of hangers extends from the underside of the fourth floor and supports the lower bridge at its midpoint. To provide additional lateral support, a set of four ASTM A500 Grade B steel hollow structural sections run diagonally down from the top floor to brace the lower bridge system, and an additional four HSS sections run diagonally up from the second floor to brace the upper bridge system.

The fact that the team was working with the concrete frame of an existing building, rather than constructing a new school from scratch, made the job even more challenging. "We had limited places to connect the tubes to," says Wilmers. "As a result, we had to spread the load out around the existing structure." Although the concrete that makes up the building's existing frame is well-suited to bear high gravity loads, it's not nearly as sturdy against lateral force, so Weidlinger Associates had to design a customized steel connection between the support tubes and concrete columns that would capture the bridges' excess lateral movement rather than transferring it to the columns. They welded together a vertical semi-circular shell, a horizontal circular plate, and a vertical pin plate that allowed for free rotation of the HSS sections serving as the supports, and then fastened the detail to the column and floor

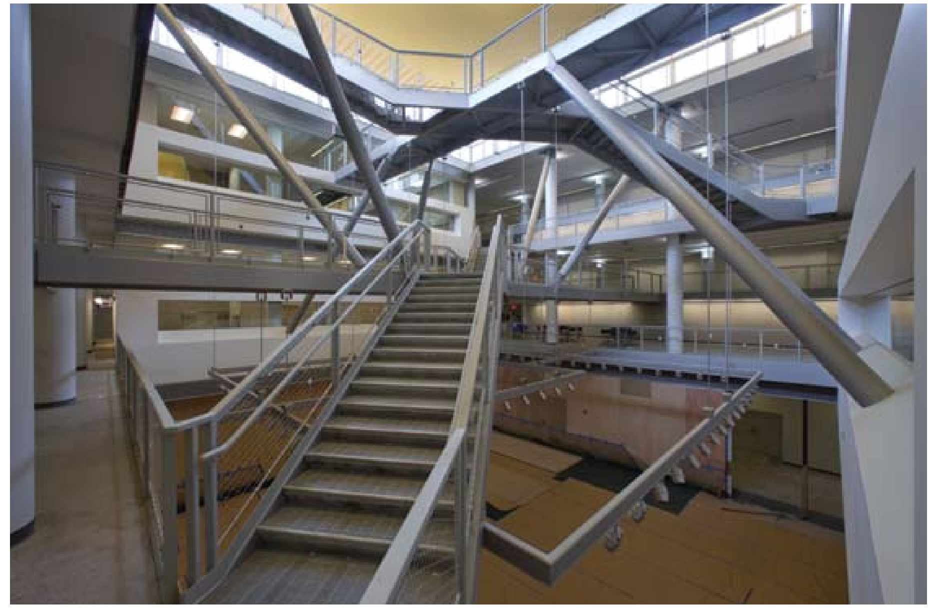
Left In the atrium, stainless and galvanized steel stairs and bridges hang from freestanding gantries above.

slab with HILTI adhesive anchor rods. To complicate matters further, the existing columns were not precisely round, so fastening the curved plates to their surface with bolts was tricky. "We had to fill some gaps with grout," says Wilmers.

Despite the array of bridges, stairs, and supports cutting across the atrium, the school's interior still feels bright and airy. Sunlight diffuses through the roof from three directions and reflects indirectly off the saffron-yellow ceiling, which doubles as the underside of the iconic amphitheater perched atop the building's roof. At the base of the atrium sits an open-air art gallery and crit space, the school's functional and physical center. To light the gallery, a set of ½-inch thick Type 304 steel rods hang down from the lower bridge to support two nested squares of track lighting, which light the gallery's interior.

An indoor bridge-and-stair system of this scale has only a few direct precedents for Viñoly. Even for Weidlinger, Jing says the project was a learning experience: "We had never built any bridge-and-stair system quite this big or complicated before." M

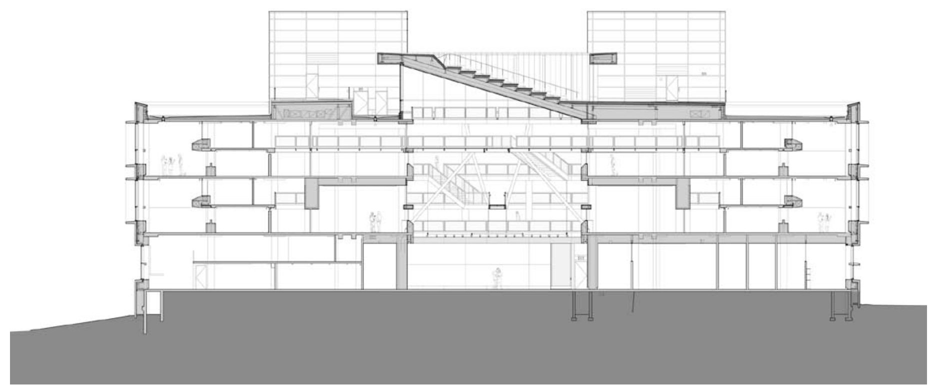
Previous spread: Bruce Damonte; this spread: Rafael Viñoly Architects PC; following spread: Bruce Damonte



Facing page Bridge sections were site-welded to each other in mid-air, then connected to the concrete slab floor, stairways, and other reinforcements.

Above A 75-foot bridge connects the east and west ends of the third floor, and a 120-foot span connects the north and south ends of the fifth floor.

Below The five-story former library building was hollowed out to create a more collaborative environment inside the 135,000-square-foot facility, while an open-air rooftop amphitheater provides additional teaching space.



Deep shelf-like windows with aluminum sun-shading louvers punctuate the building's precast concrete exterior.

CCNY COLLEGE OF ARCHITECTURE

Location: **160 Convent Avenue, New York, NY**
Owners: **Dormitory Authority of the State of New York (DASNY)**, *New York, NY*; **The City University of New York (CUNY) Department of Design, Construction and Management (DDCM)**, *New York, NY*; **The City College of New York (CCNY)**, *New York, NY*
Architect: **Rafael Viñoly Architects PC**, *New York, NY*
Structural Engineer: **Weidlinger & Associates, Inc.**, *New York, NY*
Mechanical Engineer: **Stanislav Slutsky, PE**, *New York, NY*
Construction Manager: **The LiRo Group**, *Syosset, NY*
Structural Steel Erector: **MoMetal**, *Varennes, QC*
Miscellaneous Iron Erector: **B&M Welding**, *Brooklyn, NY*
Curtain Wall Erector: **A.J. McNulty & Co., Inc.**, *Maspeth, NY*