Set among eucalyptus trees and fog, the University of California at San Francisco’s (UCSF) Parnassus campus clings precariously to the slope of San Francisco’s Mount Sutro. At its center is the Health Sciences core, a pair of bland 16-story buildings constructed in the early 1960s that now also act as the front door to the UCSF Medical Center’s newest laboratory—the Ray and Dagmar Dolby Regeneration Medicine Building (RMB), designed by Rafael Viñoly Architects. An elevator ride to the ninth floor of either of the old buildings and a walk down a nondescript corridor leads eventually to a gleaming steel and glass bridge—a vertiginous entry to the new lab.

Viñoly won the commission in 2005 with an unlikely horizontal scheme. The 660-foot-long RMB stretches ribbonlike across the hillside, improbably balanced on steel space trusses and seismic base isolators. Specific criteria in the funding required the project to be fast-tracked, so a design/build team was created. The New York–based practice collaborated with DPR Construction and the local office of architect-of-record SmithGroup, a firm known for its institutional portfolio and for its forward-thinking use of integrated project delivery (IPD). According to the collaborating firms, using IPD shaved anywhere from 12 to 24 months off of the project’s construction time.

The research center is tucked behind UCSF’s hospital on a slover of ground so steep that constructing anything on it seems like impossible folly. It is a site
that essentially doesn’t exist,” Rafael Viñoly, FAIA, says. The two tall Health Sciences buildings, several loading docks, and utility plants encroach on one side, and a winding road leading through the eucalyptus trees to the top of Mount Sutro edges the other. The location was chosen because it was the last piece of available land on the dense urban campus. But for Viñoly, the site offered some intrigue. The RMB supports the kind of human embryonic stem cell (HESC) research that is nonfederally funded and required to be clearly restricted from other research. “We started the design in 2005, under the Bush administration. At that time, California was [one of] the only states pursuing stem cell research,” Viñoly recalls. “I loved this idea of a conspiracy theory—that the building was placed there as if it was hiding behind the Parnassus campus.” As such, when viewed from Golden Gate Park, the corrugated-metal-clad research center merely peeks out from the tree line. However, the facility’s form is an outgrowth of site constraints and programmatic requirement. The south façade hugs the curving topography, accounting for the sinuous floor plan. Viñoly’s experience with science
buildings led him to reject a vertical scheme where research groups would stack one on top of each other. He thought that placing the laboratory on a single level would foster more communication between teams.

“Biological research is a completely unique environment; there is interactivity between groups and casual lines of development between subject areas,” Viñoly says. “A successful design is measured in having contributed to an integrated environment for the scientists.”

At RMB, four research areas step gently up the grade, one half-story at a time, following the road. Break areas, offices, and conference rooms occur at each level change. These are split-level moments where the various research groups can mingle and, since walls in the conference rooms and break areas are finished in erasable white board, exchange ideas. Flexible open-plan laboratories—18,367 square feet worth—are equipped with reconfigurable casework systems and quick-disconnect utilities, and complemented by another 15,539 square feet of equipment and support space. Large windows in the labs face south onto the hillside and a dense eucalyptus grove. The trees modulate direct daylight exposure, which contributed points to the building’s targeted LEED Gold certification.

Suspended from the north façade are exterior ramps and staircases; navigating from half-level to half-level, they are the reason that there are few windows on this
side of the building. Spectacular views of Golden Gate Park, downtown, and the Pacific Ocean transform the pedestrian walkways into dramatic overlooks. Steel-cable handrails set extra-high at 48 inches—6 inches above code—provide security without sacrificing openness. At the westernmost end of the building, offices and a large conference room hover over the city.

Roof terraces landscaped with native plantings top each of the laboratories. Like the exterior circulation, the gardens offer sweeping views, but according to Viñoly, they also provide more intimate gathering areas for the scientists. "There’s functional continuity between all the principal investigation areas, but in contrast, each of the roughly 6,000-square-foot gardens becomes an individualized space, where each research group can recover some level of identity," he explains. UCSF scientists are already personalizing the terraces, which are accessible via the outdoor walkways. Humble potted lemon trees and herbs have cropped up near tomato-red outdoor furniture. "The building is not just a machine," Viñoly remarks. "It adds to day-to-day life."
Pile Cap at Uplift Restraint

Floating cover plate

1/8" thick plate

1 1/2" anti-shrink grout

Thread bars

Steel bar

Solvent cement

Isolator

Pile cap

Uplift restraint

Steel beam

1 1/2" anti-shrink grout

Anchor assembly

Drilled pile

Pile cap

Pier cap

Transverse Section of Lower Pile Cap

Toolbox: Structural Supports

In light of the disastrous earthquake and tsunami in Japan—and the fact that Tokyo and San Francisco are in similar shake zones—is it possible to look at the Regenerative Medicine Building (RMB)’s dramatic structural supports and not question their source? As it happens, when Rafael Viñoly Architects conceived of a research facility precisely balanced on the nearly 45-degree slope of Sutro Baths, the San Francisco-based structural engineers Nabiöz/Thousand Associates (NIA) developed a do-it-yourself steel spine frame as a platform for the lab above. Base isolators are positioned on top of the cast-in-place concrete pier fallen wall at the foot of the hillside, roots that are organized in two linear rows and act as the building’s foundation. Eight uplift restraints are located on top of piles on the uplift side, and the steel frame is supported by friction pendulum seismic isolators and held down by tension isolators. Limiting the number of supports was crucial in order to minimize impact on the site, reduce the number of required foundations, and avoid having to relocate existing utility lines. Base isolators act essentially like half-slings—the system is rigid in the vertical direction, and moves horizontally in response to lateral forces. In case of an earthquake, the RMB may move sideways up to 23 inches, but the friction pendulum isolators dampen and dissipate ground shaking and reduce seismic forces levels.

Because the building moves too, the engineers were able to forge the costly perimeter isolation mat, generally required with this kind of system, for every perimeter of the perimeter. However, that same site condition heightened the possibility of the facility toppling over in an earthquake. To account for a 2-inch vertical lift and a 9-inch “sway” action, design fluid patterns formed. Viñoly developed custom tension isolators to be used on the uplift side of the structure. The tension isolator—which accommodates the same 2-inch rise as a standard base isolator—can withstand tons tons of uplift forces. It moves plus or minus on two opposite curved tracks with articulating rods. Maxwell-Rhadesen of Smirnoff conceived of and engineered these isolators, and, according to SmithGroup project manager Marianne O’Brien, BA, created an inspired scaled-down-up of the system using wheels stolen from his daughter’s roller blades.

Project Credits

Nabiöz/Thousand Associates (Project Manager); Michael Toporkoff (Project Manager); Architect: Rafael Viñoly Architects; Structural Engineers: Nabiöz/Thousand Associates (New Construction); Forell/Elsesser Engineers (Existing Structures); Mechanical/Engineering:-capbowels; William Baker, USA (Project Architect), Excell Associates (Project Architect); Mechanical/Engineering: ZGF Architects (Project Architect); Scottie May (Project Architect); Construction Manager: New Frontier Construction; Client: Academy of Medical Sciences, University of California, San Francisco (Interim Vice Chancellor and Campus Architect); Client: Mission Bell Mfg. Millwork (Project Manager).