

# Howard Hughes Medical Institute's Janelia Farm Research Building

Ashburn, VA



## Team

### Owner:

Howard Hughes Medical Institute  
Ashburn, VA

### Architect:

Rafael Viñoly Architects, PC  
New York, NY

### Engineer:

Thornton Tomasetti Engineers

### General Contractor:

Turner Construction Co.

### Reinforcing Bar Fabricator:

Trowbridge Steel Company, Sterling, VA

### Total Project Cost:

\$500 million

### Total Project Size:

581,000 sq ft (3-stories)

### Award:

2008 CRSI Design Award Winner –  
Education & Healthcare Facilities Category

### Photography:

Rafael Viñoly Architects, PC, New York, NY

## STRUCTURAL FRAMING SYSTEM

To help fit the new 1,000-foot-long Janelia Farm Research Building at the Howard Hughes Medical Center into its undulating location, designers created an S-shaped configuration with the use of a reinforced concrete structural frame. The building emerges from a hillside as three terraces that allow each floor in the three-story structure to have access to the outdoors.

## UNIQUE DESIGN FEATURES

The ground level features a 6-inch thick reinforced concrete slab-on-grade floor that supports the administrative and conference facilities, while an 8-inch-thick slab on grade level supports the heavier mechanical and loading-dock areas. Two 24-inch thick isolated slab zones accommodate the sensitive technical equipment and protect it from vibrations. Isolated from the building structure, the slabs provide vibration performance surpassing 5 micro inches per second.

The second and third levels include a one-way reinforced concrete slab system supported by 48-foot long beams running in a north-south direction. The beams bear on top of concrete girders spanning up to 60 feet. Reinforced concrete retaining walls, totaling 65 feet in height and 1,000 feet long, hold the hillside and allow the building to flow with the landscape.

Laboratories were designed to maximize collaboration. They are defined by a glass-roofed circulation corridor and custom-designed lab benches anchored to boxes cast into the concrete floor. The benches can be reconfigured or completely removed and replaced with workstations or traditional offices, providing maximum flexibility. Exposed concrete on the interior of the building defines the vertical circulation cores, restrooms, and enclose the building's state-of-the-art 300-seat auditorium.

The building's 180,000-square-foot landscaped roof is the second largest green roof in the United States. Its natural vegetation mirrors the natural surroundings while enhancing heating and cooling efficiency for the building.

## REASONS FOR CHOOSING REINFORCED CONCRETE

The S-shaped configuration was produced with a curved column grid with varied column spacings, ranging from 12 feet to 60 feet east to west and 22 feet to 33 feet along its length. Reinforced concrete was a natural choice for a building with such complex geometries outside and an open plan inside.

The adjacent parking garage features prestressed reinforced concrete framing to provide long, open spans that enhanced layout efficiency. Two concrete batch plants were built on the site to provide the 66,000 cubic yards of concrete needed for the construction, which speeded up construction and minimized delays for material availability. The combination reduced costs and produced a distinctive result.

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***The cast-in-place reinforced concrete frame minimized the structure's depth compared to a structural-steel system.***

**CRSI** Concrete Reinforcing  
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