## Kogod Courtyard **National Portrait Gallery**

Foster + Partners; SmithGroup; Gustafson Guthrie Nichol Washington, DC, USA prepared by Jonathan Bahe



Inner Space Juxtaposition of roof structure by Foster + Partners with landscape and scrim pool by Karen Gustafson

Photo by M.V. Jantzen



Walt Whitman described it as "the noblest of all Washington buildings". President Abraham Lincoln's second inaugural ball was held on the evening of March 4, 1865 in the building. It is within the framework of the Old Patent Office Building, now the Smithsonian Institution's National Portrait Gallery and American Art Museum that Sir Norman Foster was commissioned to create one of the newest, most dramatic spaces in Washington, DC. Selected via a competition in 2004, Foster + Partners, along with the Washington office of Smith-Group, created a striking, undulating glass roof within a diagrid steel structure to create the 27,000 square foot Kogod Courtvard. The design team was challenged by the Smithsonian Institution to create a courtyard filling several programmatic functions - "including museum circulation, café space, and event space for concerts, dinners, and parties - while also preserving to some degree the idea of the space as a garden."

"Given the importance of the Old Patent Office, the design was wholly driven by a deep respect for the existing building," Foster has said. "It was decided that it should not touch the building at any point but instead float above it like a cloud over the courtyard." Presented with the unique challenge of creating an architectural and landscape intervention which makes the space assessable, while maintaining the beauty and historical importance of the courtyard and surrounding facades, the design team has managed to create a space which is at once, both modern and historic. The light-handed, yet exquisitely executed design solution is a shining example of how an integrated approach to design can lead to the successful blending of modern and historic architecture.



Modern roof intersects historic freestone facade

Photo by David Y. Lee for the New York Times

"...the design was wholly driven by a deep respect for the existing building." - Sir Norman Foster

#### History

The original Patent Office Building, which now comprises the south wing of the National Portrait Gallery, was designed in the Greek Revival style by John Mills, a well-known 19th century architect who also designed the United States Treasury Building among many others. The building was constructed from 1836 to 1842 using traditional 19th century masonry construction techniques. Constructed from a sand-colored freestone – historically known as Aquia Creek Sandstone and found in nearby areas of Virginia – the building stands three stories tall. This same freestone was used for construction of the Treasury Building and White House, despite that its softness led to inadequate performance as a building material. Originally, Mills wanted to use granite, but the Congress deemed it cost-prohibitive. After completing the south wing, John Mills began construction of the east and west wings, but used a gray marble found in Maryland rather than the freestone. In 1851, Thomas U. Walter took over the project from Mills, and with help from others completed construction of the east, west, and north wings by 1868.

"Patent Office Building," about 1857 Chromolithograph by Edward Sachse & Co.

National Portrait Gallery Smithsonian Institution After serving as a government office building for over 100 years, the building was saved from imminent demolition in 1958 by President Eisenhower, and turned over to the Smithsonian Institution for the National Portrait Gallery and the American Art Museum. "From 1968, when the Smithsonian opened its two museums in the National Historic Landmark building, until it closed for renovations in 2000, the courtyard was a grassy outdoor space with paths leading into the museums, trees, and tables and chairs, where visitors relaxed and enjoyed the quiet of a city space enclosed on all four sides."



PATENT OFFICE.

"Floating above the courtyard, the canopy catches the light, creating a new heart at the center of this landmark in the nation's capital.." - Sir Norman Foster

## **Courtyard Enclosure**

In 2001, the Smithsonian Institution began extensive restoration and renovation of the National Portrait Gallery and American Art Museums. This comprehensive effort included, "replacing all key mechanical systems (heating, ventilation, air conditioning); replacing more than 550 windows with an ultraviolet light filter to protect artworks from damaging sunlight and a hand–blown exterior layer that looks like historic glass; restoring original marble floor pavers and matching others with historically accurate reproductions; installing new fire and security systems; and replacing elevators and electrical systems throughout the entire building."

In 2002, the scope of the project was dramatically increased when after much discussion, it was decided to enclose the central courtyard, which had previously been up to the elements. This was driven by the desire to transform the experience of the gallery space and provide the Smithsonian Institution with one of the largest event spaces in Washington, DC. After an invited competition in 2004, featuring some of the top architecture firms in the world, Foster + Partners were selected for their poetic, undulating glass roof. In addition to Foster + Partners, the project team also included SmithGroup as architect of record, and Gustafson Guthrie Nichol as landscape architect.

"Designed to do 'the most with the least', the fluid-form, fully glazed roof canopy develops structural and environmental themes first explored in the design of the roof of the Great Court at the British Museum, bathing the courtyard with natural light."

Bearing in mind that very little could be done to acoustically treat the existing facades which make up the courtyard or to soften the courtyard floor, Foster + Partners enlisted the help of Sandy Brown Associates, a London-based acoustical engineering firm to help with the acoustical characteristics of the space. After many iterations and testing, "the glass roof has a reverberation time of about 3 seconds, compared to 9 to 11 seconds for conventional glass construction." This was achieved by fastening a series of 15 mm diameter steel rods horizontally on every face of the steel diagrid roof structure. "Behind those rods are 9,000 pairs of blue jeans that have been shredded to make an acoustically absorbent surface."

The roof, which has a surface area of approximately 37,500 SF, contains 864 panes of glass, no two of which are alike. Of these panes, only 94 are triangle shaped. This level of customization, along with the extremely low tolerances of the structural system, led to an extraordinary level of integration and coordination between members of the design team, fabricators, and constructors.

## Kogod Courtyard National Portrait Gallery

#### Project Team:

Design Architect: Foster + Partners London, UK

Architect of Record: SmithGroup Washington, DC

Landscape Architect: Gustafson Guthrie Nichol Seattle, WA

Structural Engineer: Buro Happold London and New York

Deformation Analysis: Weidlinger Associates New York

M/E/P Engineer: URS Corporation

Environmental Engineer: Battle McCarthy

Acoustics: Sandy Brown Associates London, UK

Lighting: George Sexton Associates

General Contractor: Hensel Phelps

Ceiling Fabricator: Josef Gartner USA Germany "The resulting hushed, serene effect is exactly what you wouldn't expect in a space consisting of marble and sandstone walls; granite floors with radiant heating and cooling and perimeter ventilation; and that high-tech, rolling glass ceiling. If anything, the courtyard is really a study of the twin architectural conceits of atmosphere and mood, in this case created out of air, light, and flora" - Russell Fortmeyer

The Robert and Arlene Kogod Courtyard preparing for its opening at the Smithsonian's National Portrait Gallery and Smithsonian American Art Museum on Nov. 18, 2007.

Photo Credit: David S. Holloway/Reportage by Getty Images for Smithsonian Institution





## Kogod Courtyard National Portrait Gallery

#### Structure

The structural engineers were presented with the unique challenge of carrying the weight of the roof while not being able to bear any additional weight on the existing building due to poor foundation conditions, since Washington is built on a swamp. They decided to support the roof on eight columns placed around the outer edge of the courtyard space. They placed a large gasket, out of sight of all users, at the connection between the existing buildings and new roof structure. This very efficient and elegant structure allowed the design team to create a multi-function modern space without impacting the delicate, historic surroundings.





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# "It's almost like a theater where the sandstone facade becomes the stage." - Kathryn Gustafson

#### Landscape

The courtyard space of the Old Patent Office Building was transformed into a beautiful, tranquil mix of plantings, water features, and gathering spaces for the Kogod Courtyard. To create this space, Foster + Partners relied on the expertise of Kathryn Gustafson of Gustafson Guthrie and Nichol in Seattle. Gustafson created large planter boxes which double as benches, constructed from the white marble, which is used on the floor throughout the original landmark building. She also created four water scrims for the courtyard, a feature that has become a trademark of sorts for the firm. The scrims, which are sunk 1/4" into the floor, allow a film of water to gently flow towards the middle of the courtyard. These scrims can then be shut off when large events are scheduled for the space, causing them to disappear. In regards to the scrims, Gustafson said, "I wanted it to reflect the beauty of the façade, so you would see the historic architecture and the Foster roof in the ground plane."

In addition to the constructed elements of the courtyard, Gustafson also added elements of nature to connect users with nature. The planters house two 32foot tall ficus trees and sixteen black olive trees, along with a variety of shrubs and ferns. These natural elements, combined with the simplicity and materiality of the courtyard space, arguably adds as much to the space as the flowing glass roof.



Photo Credit: David S. Holloway/Reportage by Getty Images for Smithsonian Institution



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Photo Credit: Foster + Partners