

Title:	Ten Significant Tall Buildings, and the Significant Women Behind Them
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Ten Significant Tall Buildings, and the Significant Women Behind Them

Abstract

Recently, there has been a growing and overdue recognition in the architecture discipline that women are under-represented, not just in terms of leadership positions held, but also in terms of receiving credit for the work they have done. The tall building industry includes many disciplines, from contracting to construction and engineering, each of which has a similar but subtly different track record and perspective on the subject. This variation on the Case Study model highlights 10 tall buildings and the work of women in leadership roles – recognized at the time or not – who brought these great works to life.

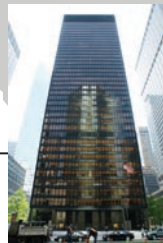
Keywords: Gender Equity, Architecture, Engineering, Construction, Urban Planning

Introduction

The following round-up of projects and associated people is by no means definitive or the “last word” on the subject. It is meant to be the beginning of an ongoing dialogue within and beyond the industry. We hope that it proves to be both inspirational and informative.



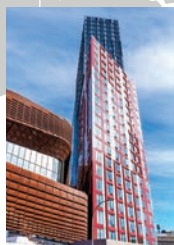
Lever House,
New York (1952)



The Seagram Building,
New York (1958)



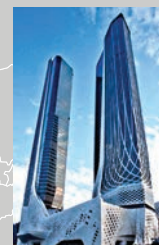
Lotte World Tower,
Seoul (2016)



461 Dean Street,
New York (2016)



VIA 57 WEST,
New York (2016)



Nanjing International
Youth Cultural Centre,
Nanjing, (2015)



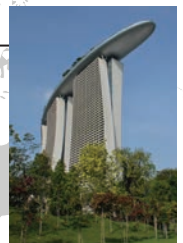
Aqua Tower,
Chicago (2008)



One World Trade Center,
New York (2014)



Jumeirah Emirates
Towers, Dubai (2000)



Marina Bay Sands,
Singapore (2010)

Lever House, New York (1952)

The Lever House, built as the headquarters of the British soap company Lever Brothers, is considered one of the seminal tall buildings in the International/Modernist style. It was one of the first buildings to break the “wedding cake” mold of previous New York skyscrapers, which had been so shaped to conform to the city’s 1916 zoning laws, intended to prevent tall buildings from depriving streets of light. The Lever House avoided this shape by occupying less than 25% of its lot, allowing it to be built as a vertical slab. The building’s blue-green, heat-resistant glass curtain wall – only the second to be installed after the United Nations Secretariat Building – was considered revolutionary at the time, and its elegant plaza and ground-floor spaces are still celebrated. It was declared a New York City landmark in 1982.



Natalie de Blois, *Design Coordinator, Skidmore Owings and Merrill (SOM), New York*

Natalie de Blois played a significant role in the design of Lever House, as well as several other Modernist buildings by SOM, including the Union Carbide (now JP Morgan Chase Tower) in New York and the Equitable Building in Chicago. But her role at the time was rarely mentioned, with credit having gone to Gordon Bunshaft and other men. “Natalie and Gordon Bunshaft were a team,” said Beverly Willis, founder of the Beverly Willis Architecture Foundation. “He took all the credit and she did all the work” (Dunlap 2013). Her work was later recognized by Nathaniel A.

Owings, one of the three original partners, in his autobiography, *The Spaces in Between: An Architect’s Journey* (1973). “Her mind and hands worked marvels in design – and only she and God would ever know just how many great solutions, with the imprimatur of one of the male heroes of SOM, owed much more to her than was attributed by either SOM or the client,” Owings wrote.



Lever House, New York. © David Shankbone (cc-by-sa)

The Seagram Building, New York (1958)

Considered to be the high point of the International Style in tall buildings, the Seagram further refined the innovations of the Lever House, with its signature bronzed-steel mullions extending the length of the building, as a way of expressing the structure inside. It was the first tall building to use high-strength bolted connections, to combine a braced frame with a moment frame, and to use a composite steel and concrete lateral frame. Its uniformity was popular with office renters and developers, which allowed them to maximize usable floor space. It was the inspiration of countless similar, if lesser buildings the world over (Lambert 2013).



Seagram Building, New York. © Antony Wood



Phyllis Lambert, *Owner's Representative Seagram Corp., New York*

Phyllis Lambert, the daughter of the Seagram beverage company owner Samuel Bronfman, played an integral role in selecting Ludwig Mies van der Rohe and Phillip Johnson to design the Seagram Building. Bronfman had originally planned to hire Emery Roth & Sons as the architect, but Lambert intervened – at the age of 27 – having learned about van der Rohe at Illinois Institute of Technology, where she had been a student and van der Rohe was head of the architecture school.

Her career of advocacy for better urban design continued when she mounted numerous protests against ill-advised construction projects in her hometown of Montréal, Canada. She later founded the Centre Canadien d'Architecture (Canadian Center for Architecture), which holds one of the world's most significant collections of architectural drawings.



Emirates Towers, Dubai © Jackardsiffant (cc-by-sa)

Jumeirah Emirates Towers, Dubai (2000)

The Jumeirah Emirates Towers are one of the most distinctive skyscraper duos in the world, and were among the first skyscrapers to be located along Sheikh Zayed Road in the financial center of Dubai, signaling a trend that has since seen the thoroughfare boom with construction activity. On the periphery of the complex, a beautifully landscaped environment with lush vegetation and meandering pathways imparts the feeling of an oasis in an otherwise rigid urban hardscape.

The towers rise from a three-story terraced podium, which houses a boutique retail mall, restaurants, and cafés. At the base, intersecting planes of curvilinear and vertical elements frame grand staircases that lead to the podium levels. Clad in silver aluminum panels, and both silver and copper reflective glass, the slim towers capture shifting sunlight throughout the day and enhance the bright city lights at nightfall. On either side of the towers are rounded low-rise parking structures, reminiscent of the shifting sand dunes that surround the city.

Hazel Wong, *Design Architect, NORR Group (at time of completion) / Executive Director, WSW Architects (current), Dubai*



Hazel Wong, while a design architect at NORR Group, designed the Emirates Towers, among the first of a huge construction boom that followed. At 355 meters, Tower One is the tallest building known to be designed by a woman architect. At the time, there were few other tall buildings in Dubai, apart from the Dubai World Trade Centre. Wong has said her key objective in designing the towers was to compose them so that they would appear differently depending on the view angle and the time of day. "The overall development displays a quiet elegance, portrayed as a distinctive and timeless piece of architecture, a quality which I try to install in all my designs," Wong has said. Wong received her Master of Architecture in Advanced Studies from the Massachusetts Institute of Technology, and her Bachelor of Architecture from Carleton University. In 2000, she founded WSW Architects, her own architectural and engineering office in Dubai.

Aqua Tower, Chicago (2008)

The Aqua Tower is an innovative residential and hotel tower in the Lakeshore East neighborhood of Chicago. While it has a conventionally rectangular floor plan, it is defined by its undulating concrete balconies, each of which is unique to the unit to which it is attached. These not only provide aesthetic interest; they also allow floor-to-floor and balcony-to-balcony sightlines, which encourages sociability among the tenants. The balconies also lower wind forces acting on the building, to the point that it does not need a supplemental damping system, saving valuable real estate for occupancy and lowering the cost of construction.



Aqua Tower, Chicago. © Hedrich Blessing



Jeanne Gang, *Founding Principal, Studio Gang Architects, Chicago*

Jeanne Gang, a MacArthur Fellow, is recognized internationally for a design process that foregrounds the relationships between individuals, communities, and environments. Drawing insight from ecological systems, her analytical and creative approach has produced some of today's

most innovative architecture such as Aqua Tower, Solstice on the Park, and City Hyde Park, all in Chicago. Gang is engaged in major projects throughout the Americas and Europe, including high-rise towers in New York, San Francisco, Toronto, and Amsterdam (see *Talking Tall*, page 54). Gang is the recipient of the 2013 National Design Award from the Cooper-Hewitt, (the Smithsonian Design Museum) and was named the 2016 Architect of the Year by *Architectural Review*. Gang is currently designing Vista Tower, which will become Chicago's third-tallest building upon completion in 2020.

Marina Bay Sands, Singapore (2010)

Marina Bay Sands is a high-density, mixed-use integrated resort that brings together a 2,560-room hotel, a sky park, convention center, shopping and dining, theaters, museum, and a casino across the water from Singapore's central business district. The 929,000 square-meter urban district anchors the Singapore waterfront and creates a gateway to Singapore. The design approach for the complex was not as a building project, but as a microcosm of a city – rooted in Singapore's culture, climate, and contemporary life. The aim was to create an urban landscape capable of addressing the issue of megascale.

The project is designed as an urban structure that weaves together the components of a complex program into a dynamic urban crossroads and public meeting place. Combining indoor and outdoor spaces and providing a platform for a wide array of activities, this vibrant, 21st-century *cardo maximus*, or grand arcade, also connects to the subway and other transportation. A series of layered gardens provides ample green space throughout the site, extending the tropical garden landscape from Marina City Park towards the bayfront. The landscape network reinforces urban connections with the resort's surroundings, and every level of the district has green space that is accessible to the public.

The Marina Bay Sands SkyPark accommodates a public observatory, gardens, a 151-meter-long swimming pool, restaurants, and jogging paths and offers sweeping panoramic views, a formidable resource in a dense city like Singapore. Shielded from the winds and lavishly planted with hundreds of trees, the SkyPark celebrates the notion of the Garden City that has been the underpinning of Singapore's urban design strategy.



Marina Bay Sands, Singapore. © Timothy Hursley



Dr. Cheong Koon Hean, CEO, Urban Redevelopment Authority (URA) (former)/CEO, Housing and Development Board (HDB) (current), Singapore/2016 CTBUH Lynn S. Beedle Lifetime Achievement Award Recipient

Dr. Cheong Koon Hean is an architect-planner who has been credited with shaping much of Singapore's urban landscape. As the CEO of the Urban Redevelopment Authority (URA) from 2004 to 2010, she led the long-term strategic planning of Singapore. In particular, she was the key driver of

Marina Bay, Singapore's new city extension, which has since become the new signature image for Singapore. A strong proponent of good design, she initiated the Urban Design and Architecture Excellence Program, encouraging the development of many high quality, high-rise buildings, transforming Singapore into one of the most livable and beautiful cities in Asia.

In 2010, Dr. Cheong was appointed the CEO of the Housing and Development Board (HDB) in Singapore. Since joining the HDB, Dr. Cheong has steered the organization towards developing well designed, community centric, sustainable and smart towns and overseen one of the largest building programs by HDB.

“Dr. Cheong Koon Hean was the primary driver of Marina Bay, the extension of downtown Singapore that has become the city-state's signature image.”



One World Trade Center, New York. © James Ewing via SOM



Nicole Dosso, *Director, Technical Department, Skidmore Owings and Merrill (SOM), New York*

Nicole Dosso was the lead technical coordinator on the One World Trade Center project, as well as 7 World Trade Center, the first building to complete on the reconstructed site after the 9/11 attacks, in 2006. Naturally, security was of paramount concern across the entire project. Supervising a team of 50 architects and designers, and by extension more than 1,000 construction workers, Dosso oversaw the incredibly complex process of securing the two SOM projects and coordinating the design and construction of their foundations with those of the rest of the WTC site, as well as incorporating a range of new security features above and below grade. The reconstruction efforts were further delayed and complicated by the storm surge accompanying Hurricane Sandy in October 2012, which flooded the newly constructed basement of One World Trade Center and much of the site.

“Dosso oversaw the incredibly complex process of securing the One and 7 World Trade Center projects and coordinating the design and construction of their foundations with those of the rest of the WTC site, as well as incorporating a range of new security features above and below grade.”

One World Trade Center, New York (2014)

One World Trade Center recaptured the New York skyline, reasserting downtown Manhattan's preeminence as a business center, and established a new civic icon for the country. It is a memorable architectural landmark for the city and the nation, and connects seamlessly to the city with linkages to an extensive underground transportation network. Extending the long tradition of American ingenuity in high-rise construction, the design solution is an innovative mix of architecture, structure, urban design, safety, and sustainability.

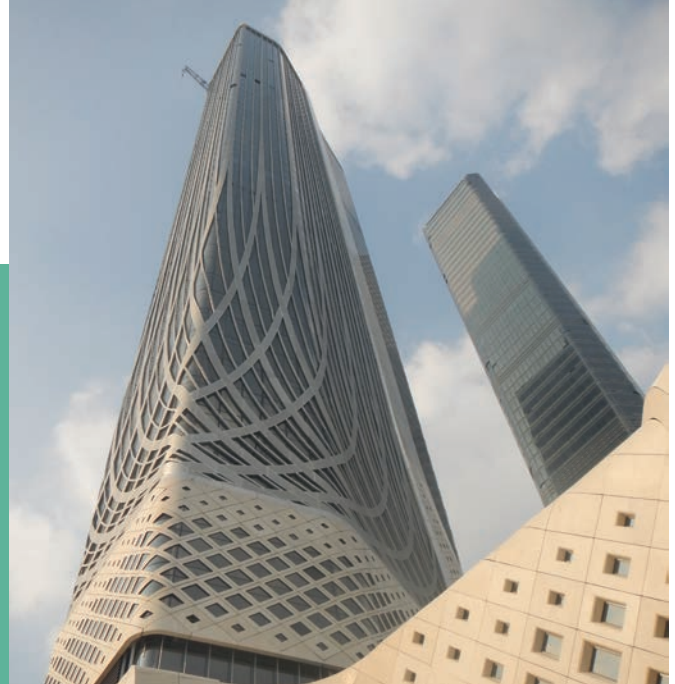
The tower is a bold icon in the sky that acknowledges the adjacent memorial. While the memorial, carved out of the earth, speaks of the past and of remembrance, One World Trade Center speaks about the future and hope as it rises upward in a faceted form filled with, and reflecting, light. This tower evokes the slender, tapering triangular forms of great New York City icons such as the Chrysler Building and Empire State Building and replaces almost one quarter of the total office space lost on September 11, 2001 in a single building.

As the tower rises from a cubic base, its edges are chamfered back, resulting in a faceted form composed of eight elongated isosceles triangles. At its middle, the tower forms a perfect octagon in plan and then culminates in a glass parapet whose plan is a 46-meter-by-46-meter square, rotated 45 degrees from the base. Its overall effect is that of a crystalline form that captures an ever-evolving display of refracted light. As the sun moves through the sky or pedestrians move around the tower, the surfaces appear like a kaleidoscope and change throughout the day as light and weather conditions change.

Nanjing International Youth Cultural Centre, Nanjing, (2015)

Nanjing International Youth Cultural Centre was designed as a complex providing a grand visual termination to the central axis of an emerging central business district positioned along the banks of the Yangtze River. Its Tower 1, at 314.5 meters, is the tallest building to have been designed by a woman-owned architecture firm. The complex rises as an offset pair of towers, rising from a shared podium, containing a large conference center and concert hall, which was opened in 2014 for the Youth Olympic Games held in Nanjing during August of that year. Inside the podium, interior spaces are sculpted with a fluid design theme that is reinforced with lighting placed in series of diamond-shaped openings of various sizes and repeated throughout the structure.

This design concept is then also translated to the exterior. The façade is composed of a complex mix of glass curtain wall panels, glass-fiber reinforced concrete (GFRC), and perforated aluminum panels. The façade also has a series of diamond-shaped voids of varying sizes, which form a pattern that turns vertically to ascend the towers and unify them with the base structure. The theme of a fluid design is also translated onto the tower exteriors, as the lower floors feature a white-colored weave of curved lines, which then transitions into a series of straight vertical accents climbing the towers until reaching the top. Millions of LEDs were imbedded into the façade to create an exterior light display racing along the towers in the evening hours, creating an iconic addition to the Nanjing riverfront.

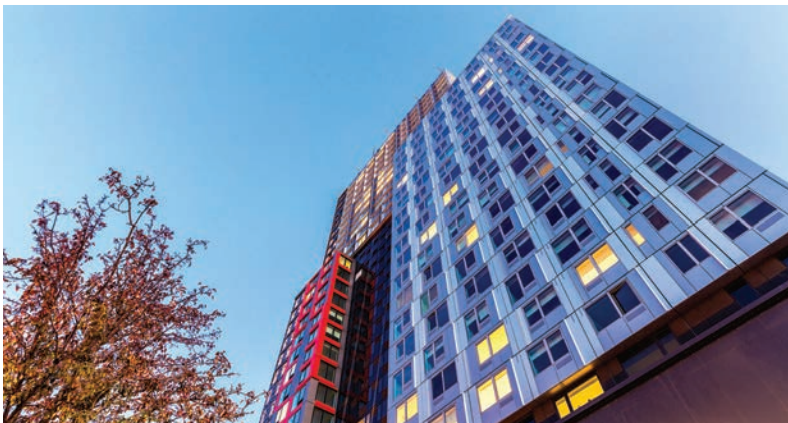


Nanjing International Youth Cultural Centre, Nanjing. © Marco Belcastro



Zaha Hadid, Founder,
Zaha Hadid Architects, London

Zaha Hadid was the first woman to receive the Pritzker Architecture Prize in 2004. She also received the Stirling Prize in 2010 and 2011. Her experimentation with parametric modeling and curve optimization led to an immediately identifiable style that extended from small objects to massive buildings; her attention to detail and precision resulted in built projects that were just as spectacular as the drawings promised. Upon her untimely death in 2016, Hadid was arguably one of the most famous architects in the world. In addition to the Nanjing Youth Olympics Centre, her tall building achievements included CTBUH 2014 Best Tall Building Asia & Australasia Award finalist – The Jockey Club Innovation Tower at Hong Kong Polytechnic University, the Wangjing and Galaxy SOHO projects in Beijing – and the under-construction One Thousand Museum in Miami. Her eponymous firm continues work on significant projects worldwide.



461 Dean Street, New York. © Mark Touhey



MaryAnne Gilmartin, CEO,
Forest City Ratner Companies, New York

Gilmartin has been the point person in the development of some of the most high-profile real estate projects in New York City, including Pacific Park Brooklyn, which contains 461 Dean St., the world's tallest volumetric modular building, as well as The New York Times Building and New York by Gehry. In addition to these projects, she has managed the commercial portfolio at MetroTech Center in downtown Brooklyn.

461 Dean Street, New York (2016)

461 Dean Street represents a breakthrough in modular design, as the tower comprises 930 steel modules fabricated off-site at the Brooklyn Navy Yard. This novel method reduced the environmental impact of construction, offering an innovative way to approach sustainability across a building's full life cycle. The basic floorplate is divided into modules that can be efficiently fabricated and fit out with systems and finishes prior to shipping to site. The largest floor plate has 36 modules per floor, generally arranged one on each side of the central corridor. Building massing variation along the height, and the desire to have a wider range of unit types, resulted in 225 unique module structure types. With variations in piping and façade, many of the 930 modules are unique. The project can be thought of more as a development of a process than the design of a specific module that will be stacked on great scale: mass customization rather than mass production. Details and methodologies are consistent, but each module is very much constructed to its own design (Farnsworth 2014).

VIA 57 WEST, New York (2016)

VIA 57 WEST, winner of the 2016 CTBUH Best Tall Building – Americas award, accomplishes the ambitious goal of forging an entirely new high-rise typology. Coined by the architect, Bjarke Ingels Group (BIG), as a “courtscraper,” the tower is a hybrid between the European perimeter block and the traditional Manhattan high-rise, while combining the advantages of both. It has the compactness, density, and intimacy of a classic courtyard building with the grandeur, airiness, and expansive views of a skyscraper.

Its atypical configuration not only offers visual thrills, but responds directly to the design challenges presented by the site.

By keeping three corners of the block low and lifting the northeast corner to the tower peak, the courtyard opens views towards the Hudson River, bringing low western sunlight deep into the block and graciously preserving the adjacent tower’s views of the river.

The unique massing of the tower offers a new solution to the traditional challenges associated with high-rise residential buildings in New York. After successfully rezoning the site to allow for hundreds of residential units, it became possible to reimagine the typical large-scale “wedding cake” residential tower ubiquitous to Manhattan. Whereas those towers do not typically provide apartments with a terrace,

daylight, fresh air, or sufficient outdoor space, VIA 57 WEST provides all of the above in a challenging site constrained by a power plant, sanitation facility, heavily-trafficked highway, and another residential tower.

Taken together, an inventive arrangement, one-of-a-kind social amenities, and a set of proven green strategies come together to form a building that offers a unique vision for the future of the skyscraper; one that manages to synthesize high-quality and visually appealing architecture with the needs of the client, all without sacrificing environmental performance or residential quality.



VIA 57 WEST, New York. © BIG



**Aine Brazil, Vice
Chairman,
Thornton Tomasetti,
New York**

Aine Brazil has been responsible for the design and construction of high-rise offices, residential

buildings, hotels, air-rights projects with long-span transfer systems, hospitals and parking garages.

At VIA 57 WEST, Brazil tackled form-driven challenges and developed a strategy for simplifying the structure. This included the use of parametric design tools to quickly calculate the loads for the constantly changing form.

Brazil also led the structural engineering team for the design of more than three million square feet (278,709 square meters) of high-rise office development in the Times Square area. Other notable projects include the major expansion of New York Hospital spanning the FDR highway, and the 60-story 731 Lexington Avenue.

“SawTeen See is a pioneer in the structural design of tall buildings. See has the distinction of leading the structural engineering design of the fifth-tallest building in the world, the 555-meter Lotte World Tower in Seoul.”

Lotte World Tower, Seoul (2016)

Lotte World Tower, at 555 meters, is the world's fifth-tallest building as of June 2017. Taking inspiration from traditional Korean art forms in the design of the various interior program spaces, the sleek tapered form of Lotte World Tower stands out from Seoul's rocky, mountainous topography. The tower is programmed with a greater variety of functions than is normally found in a tall building. It contains retail components, offices, a 7-star luxury hotel, and lodgings for small office tenants. The building's top 10 stories are earmarked for extensive public use and entertainment facilities, including an observation deck and rooftop café.

The design of the tower melds a modern aesthetic with forms inspired by Korean ceramics, porcelain, and calligraphy. The seam that runs from top to bottom of the structure gestures toward the old center of the city. Elegance of form was one of the prime objectives, following the desire of

stakeholders to bestow a beautiful monument to the capital city skyline. The exterior finish consists of light-toned silver glass, accented by a filigree of white lacquered metal.

Lotte World Tower has been designed and constructed at the same time as a 10-story base that accommodates as much area as its vertical counterpart. Vertical density is linked to horizontal density, and the range of complementary uses is increased. Connections between the two major building components are made via interior pathways at many levels, but also by active outdoor public space. In fact, one of the most effective measures taken to activate the tower and connect it to adjacent buildings is the outdoor plaza. This space forms an "outdoor room," compressed enough in its dimensions to encourage visual and pedestrian penetration of its boundary walls.

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SawTeen See,
Managing Partner,
Leslie E. Robertson
Associates,
New York

SawTeen See is a pioneer in the structural design of tall buildings. See has the distinction of leading the structural engineering design of the fifth-tallest building in the world, the 555-meter Lotte World Tower in Seoul. She is set to break her own record with the 630-meter Merdeka PNB118 in Kuala Lumpur, which is now under construction. Beyond these, she has worked on many buildings over 400 meters, and has peer-reviewed two 530-meter buildings in China.



Lotte World Tower, Seoul. © LOTTE