

Best Tall Buildings 2011



CTBUH International Award Winning Projects

Edited by Antony Wood



Council on Tall Buildings and Urban Habitat

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The CTBUH would like to thank all the organizations who submitted their projects for consideration in the 2011 awards program.

We would also like to thank our 2011 Awards Committee for volunteering their time and efforts in deliberating this year's winners.

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Eight Spruce Street

New York City, USA

Located in a part of lower Manhattan with few other towers, "New York by Gehry" at Eight Spruce Street is close to City Hall and its adjacent park. The landmark Woolworth Building by Cass Gilbert and the Brooklyn Bridge are its closest neighbors. Its significant height makes the building a prominent addition to the New York City skyline and, as the tallest all-residential building in North America, adds a significant residential population to its neighborhood. In addition to its 900 residential units, the tower also houses a pre-kindergarten-through-eighth-grade public school, and office space for the New York Downtown Hospital in its base.

The site sits between Spruce Street on the north and Beekman Street on the south, formerly a 100% impervious asphalt topped parking lot. The new project and site design minimizes the building footprint to enable 30% of the site to be developed as landscaped urban plazas which create through-block pedestrian spaces on both the east and west sides of the building. These spaces contain outdoor amenities such as landscaping, water features and public seating areas. The West Plaza creates a landscaped setting for a porte cochere that gives protected car and pedestrian access to the residential lobby.

The development of the form began by using the classical proportions of New York City towers and the traditional setback rules which have created the tall wedding cake designs typical in the city. These guidelines created the initial massing of the building. The design then developed to accommodate bay windows which the client requested in each unit. Rather than having the bay windows align vertically, they are shifted slightly from floor-to-floor and varied in size from unit-to-unit. The initial massing studies revealed that this created the look of fabric draping over the building, so the design was developed to accentuate this effect utilizing cladding in flat and undulating stainless steel panels. Seven sides of the tower have this configuration, while the south side of the tower is sheared into a flat plane that contrasts the curvature of the other façades and strengthens the sculptural composition. At the base of the tower a simple five-story brick podium ties the tower to the materiality, scale and spirit of the neighboring buildings.

Due to the undulating façade, each floor of the tower has a different configuration. The apartment interiors were carefully designed to take best advantage of these unique conditions, with large windows framing views and creating window seats on some of the large sills that are created by the movement of the wall from floor to floor. The bay windows also afford residents the opportunity to step out past the plane of the

Completion Date: April 2011
Height: 265 m (870 ft)
Stories: 76
Area: 102,193 sq m (1,100,00 sq ft)
Primary Use: Residential
Other Use: School, Office
Owner/Developer: Forest City Ratner Companies
Design Architect: Gehry Partners, LLP
Structural Engineer: WSP Cantor Seinuk
MEP Engineer: Jaros Baum and Bolles
Construction Manager: Kreisler Borg Florman
Main Contractor: Kreisler Borg Florman General Construction Company
Other Consultants: Cerami & Associates; Heitmann & Associates; Rowan Williams Davies & Irwin, Inc.; Lerch Bates, Inc.; Permasteelisa

Opposite: View of the tower looking from across the Hudson River

"The tower invigorates a part of Manhattan that has been somewhat overlooked in recent years, and as the Tallest All-residential Building in North America, adds significantly to the urban population and diversification of its neighborhood."

Richard Cook, Awards Chair, Cook+Fox Architects

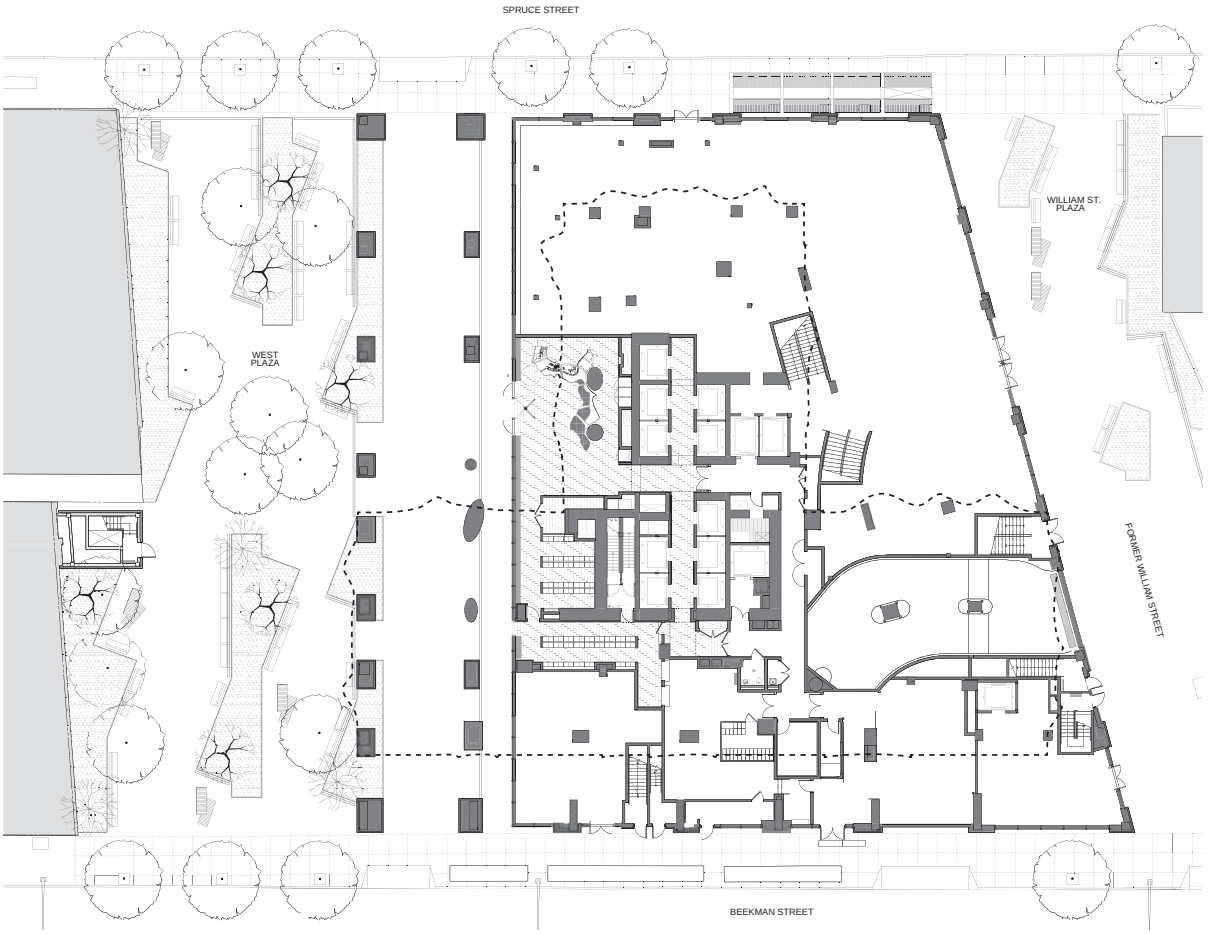
Left: Façade detail
Opposite Top: Interior view
Opposite Bottom: Site plan

"This is another spectacular example of a trend towards more organic, free-form façades in recent years (think Aqua or O-14). The view from below looking up is breath-taking. The building manages to somehow both fit into—and challenge—the Manhattan skyline."

Antony Wood, Juror, CTBUH

exterior wall in what the architect has coined "stepping into space" and to have the feeling of being suspended over the whole of Manhattan. The apartments range in size from 450 sq ft (41 sq m) studios to 1,700 sq ft (158 sq m) three-bedroom apartments at the top of the tower. All residential units are provided with natural light and natural ventilation to minimize the demands on artificial ventilation and lighting. Further, natural daylight is provided in 75% of the building's residential corridors.

The tower was designed using the "Digital Project" software developed by Gehry Technologies. This software enabled cost and fabrication information to be automatically produced for every design iteration, which allowed the design team to optimize the design quality while continually meeting the client's budget. The project's exterior wall was completely documented in the 3D computer model. The curtain wall geometries were rationalized into three types of geometries—standard flat panels, moderately shaped panels, and highly shaped panels. The shop drawings were produced automatically from the digital model and connected directly to the fabricator's production machinery. This streamlined communication and removed errors. Because of this tight coordination


SPRUCE STREET
WILLIAM ST.
PLAZA
WEST
PLAZA
FORMER WILLIAM STREET
BEEKMAN STREET

Jury Statement

A beautiful building, elegantly fitting into its Manhattan context, "New York by Gehry" at Eight Spruce Street uses the very latest in computer-enabled construction to efficiently deliver a façade of great variety and vitality. With its draping fabric-like quality, the façade creates a unique signature, and instant landmark. At the same time the building holds itself as very much a "New York building," grounded in the city's traditional setback rules. The tower's differentials are underlined by two facets—clean design and spatial harmony; both key to modern living.

The tower enhances its immediate urban surroundings, meeting the ground in a more traditional brick podium whose diverse program adds office space for the adjacent hospital and a much needed elementary school, while through-block public plazas benefit the pedestrian experience. The tower brings a large residential program to its neighborhood adding significantly to the urban population, and—given its signature quality—holds great potential to spark the continued diversification of the area.

from design through fabrication, there were zero change orders from the contractor on the curtain wall, a remarkable feat and a significant cost saving on the project.

Several strategies were implemented in the design to reduce energy consumption in the tower. All components of the exterior curtain wall assembly are thermally broken and high-performance insulated glass was used at all glazed openings, minimizing heat loss through the exterior wall system. Light reflecting pavers were used on all roofs to minimize the amount of heat gain to the building and create a thermally protected roof slab. Radiant floor heating is provided in the public spaces to minimize the excessive loading on the mechanical systems, and high efficient linear fluorescent light fixtures are used through the residential corridors.

Left: Façade detail
Opposite Top Left: Looking down from a bay window
Opposite Top Right: View up at rear south elevation
Opposite Bottom: Typical floor plan

KfW Westarkade

Frankfurt, Germany

One of the first office towers in the world predicted to run on less than 90 kWh/m² of primary energy per year, KfW Westarkade uses approximately half the average energy of European office buildings, and one-third of American. The building forms a 14-story extension to the KfW's headquarters in Frankfurt, completing an existing ensemble of buildings from the last four decades by adding 700 new workplaces. Situated in the city's West End, it lies adjacent to the Palmengarten park.

The streamlined shape of the tower integrates itself into the cluster of existing buildings. It acts as a colorful interface between two distinct urban spaces: while it appears as a slim slab towards the city, it presents a discreet backdrop to the park and provides open sightlines for the existing ensemble. Furthermore it exploits the prevailing wind direction for controlled natural ventilation of the offices by means of its unique double layered wind-pressurized façade.

The new building extends the premises of the KfW Banking Group to the west with a four-story podium that clearly delineates the edge of the Zeppelinallee road. The tower above it is formed in such a way that it does not obstruct the view from the existing office floors of the main building. Together with the main buildings and the adjacent existing structure, the building's south side creates a communal courtyard. The landscaped areas of the southern end of the Palmengarten are drawn through the site leading to this courtyard, resulting in a coherent open space.

The various spatial effects of the building are enhanced by the polychromy of the façade's narrow ventilation flaps, whose various colors address the different city spaces surrounding them: a family of green tones front the Palmengarten, while the hues of the red Main sandstone so prevalent in urban Frankfurt are interpreted along Zeppelinallee Road, and a group of blues complements the color scheme and materiality of KfW's recently renovated main building.

The construction and use of the Westarkade is governed by numerous built and behavioral features to maximize sustainability, led by three factors: natural ventilation, activated slabs, and geothermal energy.

The building had as its primary aim to make a significant advance in the field of natural ventilation of tall buildings, as a significant component of their overall sustainability. The dynamically-controlled pressure-ring façade serves to neutralize external wind conditions which are otherwise too turbulent for operable windows, especially on higher floors. The façade's outer layer contains sensor-controlled flap openings that maintain a constant and even air pressure within

Completion Date: May 2010
Height: 56 m (184 ft)
Stories: 14
Area: 11,000 sq m (118,403 sq ft)
Primary Use: Office
Owner: KfW Bankengruppe
Design Architect: Sauerbruch Hutton
Associate Architect: Architekten Theiss Planungsgesellschaft mbH
Structural Engineer: Werner Sobek Group
Energy Concept: Transsolar
MEP Engineer: Reuter Rührgartner GmbH; Zibell, Willner & Partner
Project Manager: Architekten Theiss
Main Contractor: ARGE Züblin/Bögl
Other Consultants: Sommerlad Haase Kuhli; Müller-BBM Bauphysik; Licht Kunst Licht; hhpberlin Ingenieure für Brandschutz GmbH

Opposite: Overall view from the south

"The Westarkade building is a profoundly important example of bridging theory and practice, with a built form of true beauty."

Richard Cook, Awards Chair, Cook+Fox Architects

Left: Façade detail
Opposite Top Left: Façade showing transition from park-facing to street-facing elevations
Opposite Top Right: Façade detail from interior
Opposite Bottom: Detail section showing office ventilation strategy

"The streamlined form integrates itself into its surrounding context, while simultaneously standing out through the playful use of color."

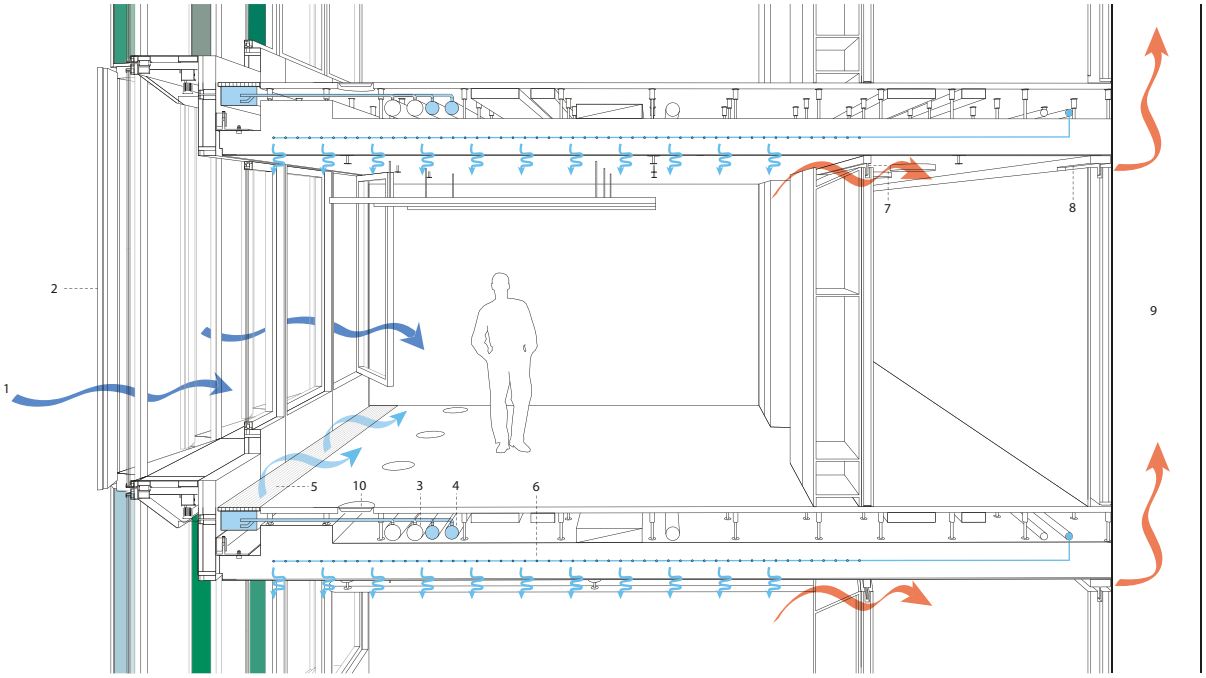
Peter Murray, Juror, New London Architecture Centre

the ring. The inner layer has operable windows that allow the offices within to be ventilated. The air flow within the pressure ring is regulated to never exceed 6 m/s. The flaps are designed to adjust to five wind directions as well as outside temperature, solar radiation and pressure differences on the windward and leeward sides of the building.

Exhaust air flows through noise-attenuating overflow elements in the office partitions and along corridors until it reaches the cores, where the air, through stratification, is naturally driven upward to the roof through shafts.

As a result, the offices can be ventilated naturally for eight months of the year without creating drafts or undesired heat loss. Mechanical ventilation is required for less than 50% of all working hours. The double façade also functions as a passive thermal solar collector, as the flow of fresh air is pre-tempered by solar radiation within the double façade. In this way heat loss is minimized and heat energy is conserved. The outer skin of the double façade can be opened completely in order to avoid overheating of the building in summer.

The building employs thermally activated slabs, whereby a system of pipes built into the solid floors conveys water that serves as both a heating and cooling medium. This creates exceedingly energy-efficient, comfortable and constant room temperatures. Due to the high thermal storage capacity of the solid concrete floors, the rooms can be sustainably heated and cooled without the extremes in water temperature that are required with traditional radiators. For this sort of tempering, energy can be used that already exists in



1 – Fresh air supply
2 – Air vent
3 – Central heating lines
4 – Central cooling lines
5 – Air vents or under-floor convectors in every second axis
6 – Thermo-active building components
7 – Sound-attenuating air overflow
8 – Central exhaust
9 – Vertical exhaust shaft using natural stratification
10 – Under-floor electrical outlet

Jury Statement

As we design for a sustainable future, we desperately need a new definition of beauty that goes beyond skin deep. Already being touted as one of the most energy-efficient office buildings in the world, KfW Westarkade stands out as a shining example of a truly environmentally-responsible project.

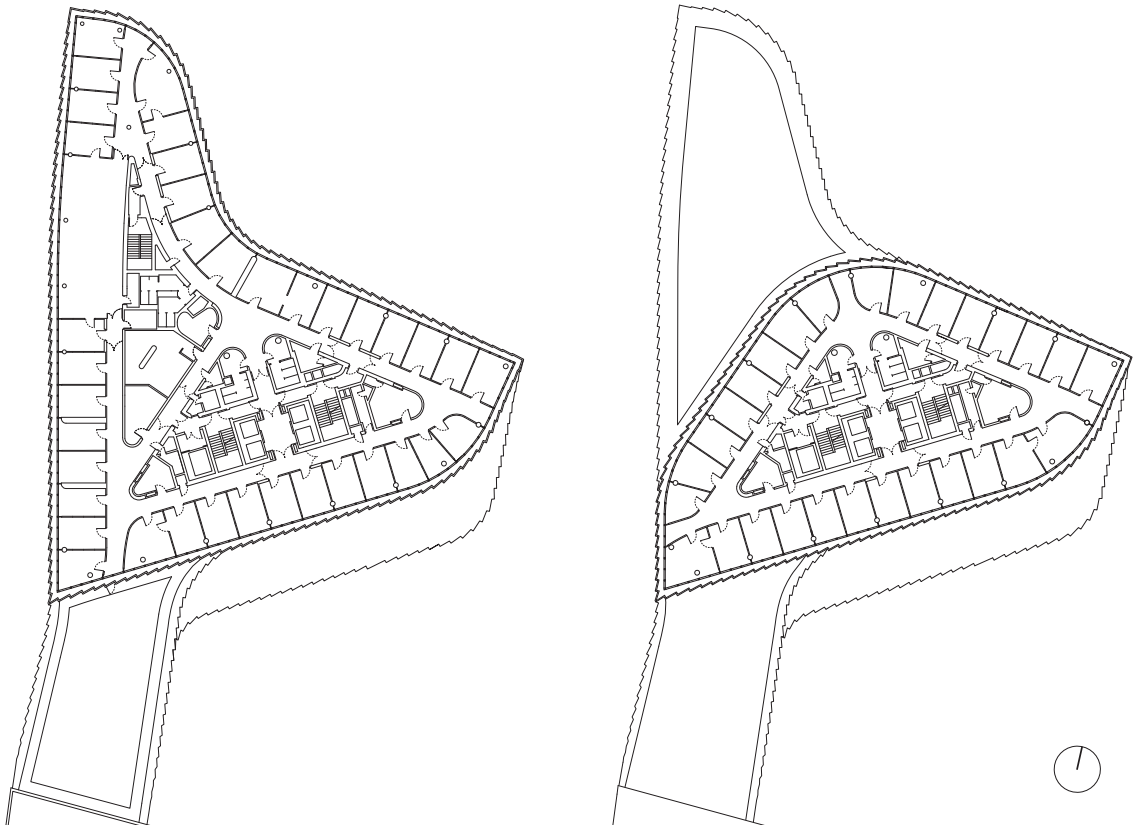
The building has been carefully integrated into its context, forming relationships with its neighboring buildings, streets and parkland, while simultaneously standing out through the playful use of color. Whereas many buildings use color as a way to mask an otherwise unremarkable building, here it contributes an additional rich layer to what is already a remarkable building. Germany already has a strong reputation for achieving natural ventilation in tall office buildings, and Westarkade can now be added most positively to that list.

the building: the waste heat from the data processing center can cover half of this heating demand.

The construction of Westarkade lent itself to the installation of an underground duct that allows air that is largely contaminant-free to be drawn from beside the Palmengarten and fed into the office areas. From the shaft where the air is drawn, fresh air travels though ventilation tubes in the foundation slab and into the building's ventilation system. The dimensions of this geothermal duct allow for the cooling of warm outside air in summer, while in winter the situation is reversed with the temperature differential becoming positive.

The architecture and technical facilities are configured to exploit natural daylight to the highest possible degree. Horizontal louvers in the space between the façades protect the building from high solar radiation and glare. An integrated sunlight redirection system in the upper third of the sun protection enables spaces to be comfortably shaded without becoming too dark.

Left: Façade detail at corner
Opposite Top: Third floor plan (left), typical tower plan (right)
Opposite Bottom: Interior office space



Adrian Smith

Adrian Smith + Gordon Gill Architecture

Adrian Smith is one of the world's most prolific and celebrated designers of supertall towers. As of mid-2011, he has designed four of the world's top eleven tallest completed buildings all while at his former firm, Skidmore, Owings & Merrill: Dubai's Burj Khalifa (No. 1), Nanjing's Zifeng Tower at Nanjing Greenland Financial Center (No. 7), Chicago's Trump International Hotel & Tower (No. 10) and Shanghai's Jin Mao Building (No. 11).

Smith's design portfolio at SOM also includes Tower Palace III, currently South Korea's second tallest building; 7 South Dearborn (1999–2004), a 610-meter (2,000-foot) tower designed for the Chicago Loop that, if built, would have been the tallest building in the United States; London's 201 Bishopsgate/Broadgate Tower, which the CTBUH named the Best Tall Building completed in Europe in 2009; and the 71-story, 310-meter (1,016-foot) Pearl River Tower, scheduled to open in late 2011 in Guangzhou, China, as the world's most highly sustainable supertall building.

At Adrian Smith + Gordon Gill Architecture, which he co-founded with Gordon Gill and Robert Forest in 2006, Smith's portfolio includes the just-announced Wuhan Greenland Center in Wuhan, China. At 606 meters (1,988 feet), the project will likely be China's third-tallest building, and the fourth-tallest in the world, when completed in 2016. Earlier supertall designs at AS+GG include 1 Dubai, 1 Park Avenue and Meraas Tower, all commissioned by the government-backed Meraas Development in Dubai, United Arab Emirates; and the 104-story Abu Dhabi Tower in Qatar.

Smith's major contributions to the advancement of the supertall typology began in 1993, when he and his team at SOM won an international competition to design Jin Mao Tower. The design process was informed by Smith's lifelong design philosophy of contextualism, which engages the history, art, landscape, climate, vernacular architecture and indigenous materials of the places where his buildings are located. Smith's design goals are to interpret the societies that his buildings serve, and to forge a unique dialogue between culture and place.

Opposite: Burj Khalifa, Dubai (2010). The tallest building in the world at 828 meters (2,717 feet), it soars an impressive 63% higher than the previous world's tallest

"Adrian's body of work includes some of the world's tallest and most recognized buildings, yet his designs transcend mere height and have become landmarks because of their graceful design and inherent sensitivity to local context and culture."

Peter Irwin, CTBUH Trustee, RWDI

Left: 7 South Dearborn, Chicago (proposed – 1999)
Right: Jin Mao Building, Shanghai (1999)
Opposite Left: The Broadgate Tower, London, UK (2008)
Opposite Right: Trump International Hotel & Tower, Chicago (2009)

In keeping with that philosophy, Smith's winning scheme for Jin Mao drew its inspiration from traditional Chinese architecture. His intention was to create an iconic landmark tower made specifically for China and that could only exist in China. He reinterpreted the ancient pagoda form in a contemporary idiom and with contemporary technology, including digital design tools, and contemporary building materials.

The finished building, which opened in 1999, was one of the most critically lauded skyscrapers ever built, praised for its synthesis of culturally-sensitive design and cutting-edge technology. "It is China's most intelligent building, with the equivalent processing power of a spaceship and wire enough to span the Pacific," Thomas J. Campanellla wrote in 2000 in Architectural Record. "It is also an icon, already known on the street as *dong fang ming zhu*—'shining pearl of the east.' … The infusion of historical reference in the design of a skyscraper is among architecture's most perilous endeavors. … Jin Mao, though, successfully fuses past and present, melding the two with subtlety and restraint."

More than a decade later, critics are still raving about Jin Mao Tower, whose soaring central atrium has come to be photographed nearly as often as its full-metal-jacket exterior. "One of the best skyscrapers

Jury Statement

Even considering the many seminal figures that have come out of Skidmore, Owings & Merrill, Adrian Smith is one of the "giants" that have not only shaped that firm, but also the profession. He has also shown his considerable talent and vision in beginning his "second career" together will Gordon Gill at Adrian Smith + Gordon Gill Architecture. His strong commitment to the environment and sustainable design are commendable. His work on such projects as the Chicago de-carbonization plan is an excellent example of his leadership in these fields.

Adrian is one of a relatively small number of architects who has designed and built a significant number of not only tall, but supertall, buildings internationally. As such, his contribution to the development of the typology is beyond doubt. Equally as exciting are the "as yet unannounced" tall projects that are scheduled to come from his office in the coming months.

Left: View of the dramatic hotel atrium at the top of the Jin Mao Building, Shanghai (1999)
Opposite Left: Nanjing's Zifeng Tower at Nanjing Greenland Financial Center, Nanjing (2010)
Opposite Right: Wuhan Greenland Center, Wuhan (proposed – 2016)

"Adrian is certainly well known for his impressive design of numerous supertall towers. What is equally impressive is his commitment to sustainability and the environment."

William Maibusch, CTBUH Trustee, Turner International

built anywhere in the last decade," Los Angeles Times architecture critic Christopher Hawthorne proclaimed of Jin Mao in 2005.

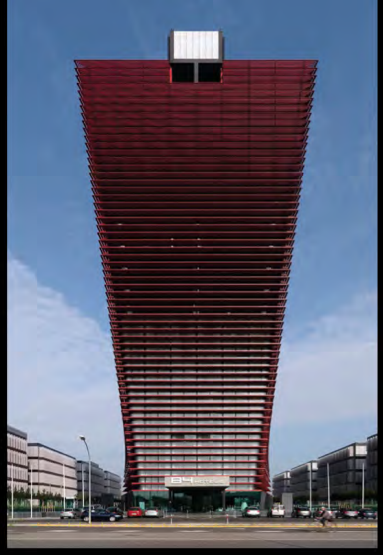
Perhaps Smith's most impressive achievement in the typology is the slender, tapering Burj Khalifa, at 828 meters (2,717 feet)—the world's tallest building. Since its spectacular opening amid heavy global media coverage in January 2010, Burj has been showered with awards—including the inaugural "Global Icon" Award from the CTBUH, which was specially created in 2010 to recognize the outstanding achievements of the project. The building has received the highest kudos from several of the world's leading architecture writers. "A shimmering needle, its delicacy as startling as its height," Paul Goldberger wrote in The New Yorker. In Architectural Record, Robert Ivy called the Burj "possibly the world's most elegant, as well as tallest building—spare, using a minimum of mass, structurally tight, and architecturally evocative." In the Chicago Tribune, Blair Kamin called it "a great leap forward in height and, especially for Dubai, in design quality. It is a luminous, light-catching skyscraper that looks like a skyscraper—ridiculously tall, but exqui-

sitely sculpted, elegantly detailed and unapologetically exultant. …The Burj offers God-is-in-the-details articulation along with its dazzling shape."

Burj Khalifa and Pearl River Tower both represent significant advances in the manipulation of architectural form in relation to sustainable performance, especially in terms of wind resistance and, in the case of Pearl River, the ability to harvest environmental forces (in particular wind and solar) to generate electricity on-site. Smith and Gill are continuing to develop these concepts—which they summarize in the phrase "form follows performance"—in AS+GG supertall projects. Concept designs for 1 Dubai and 1 Park Avenue, for example, featured building-integrated photovoltaics working alongside shading devices as part of a sophisticated and highly efficient exterior wall system.

The Meraas Tower design emphasized a faceted shape that channels airflow into building-integrated wind turbines. The just-announced Wuhan Greenland Center, scheduled for completion in 2016, uses a highly aerodynamic shape, including a domed top, to allow air to move around the building while reducing the buildup of vortex action around the tower and minimizing structural pressure and related movement within it.

For these and other efforts, Smith—now in his 45th year as a working architect—remains at the forefront of tall building design. His work has earned more than 120 awards worldwide.



The Council on Tall Buildings and Urban Habitat (CTBUH) is the world's foremost authority on tall buildings. This book is the culmination of the annual awards process in which the CTBUH recognizes outstanding tall buildings from the past year. One winner is chosen from each of four geographical regions (Americas, Asia & Australasia, Europe, and Middle East & Africa) and a further award presents the title of Best Tall Building "Worldwide" to one of the four regional winners. Additionally the CTBUH awards two annual lifetime achievement awards to individuals who have made a significant contribution to the design or technical advancement of tall buildings.

The book provides an overview of the winning, finalist and nominee projects (and careers of the Lifetime Achievement winners). Winning and finalist projects are fully profiled with stunning images, as well as detailed drawings and plans, which accompany an in-depth account of the buildings' architectural design, structural design, and any innovations in fields such as program or sustainability. The book also features the official current list of the "100 Tallest Buildings in the World" as the CTBUH is the internationally recognized official arbiter of tall building height.

Highlighting the best tall building construction from 2011, Best Tall Buildings seeks to represent those projects with the most innovative design and those which strive to advance the profile of the tall building as an integrated sustainable element in cities across the world. Fascinating and inspiring reading for all those interested in the planning, design and construction of tall buildings.

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