

# STRUCTURAL ENGINEERING *Excellence* AWARDS

The National Council of Structural Engineers Associations (NCSEA) is pleased to publish the winners of the 2022 Structural Engineering Excellence Awards. The awards were announced Thursday, November 3<sup>rd</sup>, during NCSEA's Structural Engineering Summit, held at the Chicago Hilton. A video of the presentation can be found on the NCSEA website. The Awards are given annually; each year, the entries highlight work from the best and brightest in our profession.

A new award was introduced this year at the Summit – **The Structure of the Year Award**. This new award was created to honor the most innovative and creative project, regardless of category or budget. This award was determined by an independent group of past presidents whereby they ranked the eight Outstanding Structure Category Winners based on the judging criteria used in each category. The award went to Climate Pledge Arena – Seattle, Washington; Thornton Tomasetti.

*Awards were given in eight categories, with eight Outstanding projects awarded. The categories were:*

- New Buildings under \$30 Million
- New Buildings \$30 Million to \$80 Million
- New Buildings \$80 Million to \$200 Million
- New Buildings over \$200 Million
- New Bridges and Transportation Structures
- Forensic | Renovation | Retrofit | Rehabilitation Structures under \$20 Million
- Forensic | Renovation | Retrofit | Rehabilitation Structures over \$20 Million
- Other Structures

The 2022 Awards Committee was chaired by Carrie Johnson (Wallace Design Collective, PC, Tulsa, OK). Ms. Johnson noted: "The judging was conducted in two rounds. NCSEA Past Presidents performed the first round; the second round was done by the Northeast Chapter of the Florida Structural Engineers Association (FSEA). The judges were truly impressed by the quality, innovation, and creativity of the award submissions." The judges selected the winning projects based on the following criteria:

- the creativity of structural design
- the complexity of criteria or unique problems
- innovative application of new or existing material or techniques
- efficient use of materials and labor
- constructability challenges and solutions

Please join NCSEA and **STRUCTURE** magazine in congratulating all the winners. More in-depth articles on several of the 2022 winners will appear in the Spotlight section of the magazine over the 2023 editorial year. Visit the NCSEA website for more information at [www.ncsea.com](http://www.ncsea.com).



*Outstanding Project*



**M.O.R.E. CABIN** LA PÊCHE, QUÉBEC, CANADA  
DAN BONARDI CONSULTING ENGINEERS INC.



The m.o.r.e. Cabin is a 900-square-foot private retreat on a hill overlooking Lac du Brochet, Québec. The building touches the site at only two points: a small concrete storage building supports the cabin at the top of the hill, and a steel mast supports the opposite end. The cabin cantilevers 25 feet beyond the mast. The structure consists primarily of glulam members and cross-laminated timber panels (CLT). Wood was chosen because of its sustainable qualities. Prefabricated glulam and CLT components reduced installation time, and the natural beauty of the wood panels eliminated the need for wall and ceiling finishes.

*Outstanding Project*



**IDAHO CENTRAL CREDIT UNION ARENA** MOSCOW, ID | STRUCTURECRAFT



The Idaho Central Credit Union Arena models the use of timber in long-span sports facilities in North America. Inspired by the undulating landscape forms of the Palouse region, the 4,000-seat multi-use facility was designed as a dramatic gateway to the University of Idaho campus. The dominant feature of the structure is the majestic timber roof, a doubly curved plywood diaphragm supported by 150-foot hybrid timber/steel trusses, all carefully proportioned for both aesthetics and structural efficiency. A parametric model was created using genetic algorithms to perform structural optimization on the trusses.

*Outstanding Project*



**TIANFU AGRICULTURAL EXPO MAIN HALL**  
TIANFU, CHENGDU, CHINA | STRUCTURECRAFT WITH LOCAL DESIGN INSTITUTE (CHINA ARCHITECTURE DESIGN & RESEARCH GROUP)



At over 807,000 square feet, the new Tianfu Agricultural Exposition is the largest timber structure in Asia and one of the largest in the world. This series of five vaults uses hybrid timber-steel Vierendeel-inspired trusses, achieving clear spans up to 360 feet and heights up to 144 feet. The unique wave of the building ensemble blends gently into the landscape, displaying agricultural products from the region and providing a direct connection with the surrounding farmland. Through the cooperation of team members on 3 continents, a series of world-class long-span timber structures was achieved.



Outstanding Project

## SoFi Stadium

INGLEWOOD, CA | WALTER P MOORE



SoFi Stadium features eight applications never used at this scale or in a stadium: 1) World's largest and longest cable net structure; 2) First large-scale application of triple pendulum seismic isolators in a long-span structure; 3) Sports industry's first micro-operable roof panels; 4) Largest Mechanically Stabilized Earth wall ever built; 5) First combined large-scale lateral system utilizing Buckling Restrained Braces and Lockup Devices; 6) First seismic building application of prestressed cantilever bridge technology; 7) The largest center-hung video board in sports; and 8) The first use of ETFE roof to create a large-scale roof media screen.



Outstanding Project

## I-74 OVER THE MISSISSIPPI RIVER

QUAD CITIES, IL AND IA | ALFRED BENESCH & COMPANY



Spanning the Mississippi River between Iowa and Illinois, the \$1.2B reconstruction of I-74 is an engineering marvel that will benefit the region for decades. The signature elements are a pair of basket-handle, true arch bridges with an 800-foot navigation span. The eastbound structure also supports a multi-use path, cantilevered outside of the rib, allowing pedestrians and bicyclists to cross the Mississippi River while taking in the wonderful views. Several ingenuities were implemented, including long, unbraced ribs with Vierendeel bracing, innovative stainless steel rods at the arch anchorage, and a hybrid foundation to transfer the massive thrust loads to bedrock.



Outstanding Project

## FOX PLAZA TOWER SEISMIC UPGRADE

SAN FRANCISCO, CA | SAIFUL BOUQUET STRUCTURAL ENGINEERS, INC.



Fox Plaza Tower is a 30-story steel building with an unconventional lateral system consisting of steel moment frames. These frames have haunched beams with Pre-Northridge welded moment connections to both strong and weak axis of built-up columns in a space-frame configuration. The connections' unique characteristics necessitated full-scale laboratory testing and extensive nonlinear response history analysis to assess the building's seismic performance. The seismic retrofit scheme was specifically tailored to address concerns with excessive building drift and the potential for building collapse, including direct connection strengthening at the upper levels and exterior braced frames with fluid-viscous dampers at the lower levels.

Outstanding Project - Structure of the Year



CLIMATE PLEDGE ARENA

SEATTLE, WA | THORNTON TOMASETTI



Seattle's historic KeyArena has been transformed into a new home for the NHL's Seattle Kraken. The \$930-million renovation is now Climate Pledge Arena. To preserve the landmarked, 44-million-pound roof structure and exterior curtain wall, it was necessary to temporarily support the roof and build the new arena underneath. Additional challenges include high seismicity, an aggressive schedule, and a commitment to making it the first net-zero-certified arena in the world. The project team worked together to address these challenges and transform a historic venue into a first-class sports and event facility, which opened in time for the 2021-2022 NHL season.

CATEGORY 8: OTHER STRUCTURES

Outstanding Project



SFU STADIUM

BURNABY, BC, CANADA | FAST + EPP



The new 1,800-seat stadium at Simon Fraser University is home to the SFU Athletics Team and a new facility for community and student events. The crowning piece of the design is a striking CLT canopy that cantilevers 52.5 feet, providing weather protection and unobstructed views for the spectators below. Early in the design process, the design team had the idea of hanging CLT panels below cantilever steel girders, providing a 'wow' statement of continuous wood structure. Supported by steel girders, the canopy required careful structural detailing to ensure the exposed structure was seamlessly coordinated with the design team's vision.



2022 PANEL OF JUDGES

PAST PRESIDENTS – (FIRST ROUND)

- Ben Nelson, P.E. – *Martin/Martin*
- Marc Barter, P.E., S.E. – *Barter & Associates*
- Craig Barnes, P.E. – *CBI Consulting*
- Mike Tylk, S.E. – *TGRWA*
- Jim Malley, S.E., P.E. – *Degenkolb*
- Tom Grogan Jr., P.E., S.E. – *(Retired)*

- Vicki Arbitrio, P.E. – *Gilsanz Murray Steficek*
- Barry Arnold, S.E. – *ARW Engineers*
- Bill Bast, S.E. – *Socotec*
- Carrie Johnson, P.E., S.E. – *Wallace Design Collective*
- Jon Schmidt, P.E. – *Burns & McDonnell*

FLORIDA STRUCTURAL ENGINEERING ASSOCIATION – FSEA (SECOND ROUND)

- Ryan DuChanois, EI – *Haskell*
- Doug Braaksma, P.E. – *Automation Computer Concepts, Inc.*
- Abhijit Mulay, P.E. – *Jacobs*
- Brendon Robas – *Haskell*
- Haidyn Owens, EI – *Haskell*
- Andrea Toro-Downard, EI – *Haskell*
- Carrie Johnson, P.E., S.E. – *Wallace Design Collective*
- Alex Fonteriz, P.E. – *RS&H*

- Dan Charletta, P.E. – *Structures International*
- Patrick Mull, P.E., S.E. – *RS&H*
- Tom Grogan Jr., P.E., S.E. – *(Retired)*
- Jeff Auld, P.E. – *RS&H*
- Jeff McGee, P.E. – *G.M. Hill Engineering, Inc.*
- Jay Patel, P.E. – *Arup*
- Gopal Sudhirkumar, P.E. – *Stellar*
- Ben Nelson, P.E. – *Martin/Martin*

## FAST + EPP HOME OFFICE

VANCOUVER, BC, CANADA | FAST + EPP



Fast + Epp's four-story home office building embraces design elegance and curiosity – traits the firm has become known for. The office serves as a living laboratory with new ideas and technologies being tested both during construction and throughout the life of the building. With an emphasis on promoting employee wellness and productivity, the building combines the latest in sustainable design strategies while taking full advantage of the spectacular mountain views to the north.

## HELIOS EDUCATION CAMPUS

PHOENIX, AZ | PK ASSOCIATES, LLC



Courtesy of Dror Baldinger

Designed for resiliency and sustainability, the Helios Education Campus includes a complex 2-story, 85,000-square-foot steel-framed building over a daylight 210-stall cast-in-place parking structure designed to adapt to future offices. The campus features offices and meeting spaces focused on postsecondary education advancement for the community. The structure evokes the geology of Arizona, including a canyon-like, landscaped amenity deck and a sculptural exterior façade. Feature stairs and concrete walkways appear to float.

## ARKANSAS MUSEUM OF FINE ARTS

LITTLE ROCK, AK | THORNTON TOMASETTI



The reimaged Arkansas Museum of Fine Arts adds a concrete folded plate roof, dubbed the Blossom, to create a cohesive link between seven existing structures. For the analysis, the design team needed to accurately capture the folded plate behavior and establish a rebar layout early in the design process. The 8-inch mild reinforced slab achieved a thin and delicate profile. In addition, long spans and open spaces were achieved using the geometry of the folds.

## AUDREY IRMAS PAVILION AT WILSHIRE BOULEVARD TEMPLE

LOS ANGELES, CA | ARUP



Courtesy of Jason O'Rear Photography

The new Audrey Irmas Pavilion, on the Wilshire Boulevard Temple campus in Los Angeles, is a 3-story event and gathering place serving congregants and the community. Within a complicated sloped building geometry, the 57,000-square-foot building has multiple split floor levels, large open spaces, and assembly areas at each level, including the roof terraces. The design approach resulted in a cost-effective code-based structural framing system to accommodate the complex geometry, high seismic demands, and functional requirements.



THE JUDGES WERE TRULY IMPRESSED BY THE QUALITY, INNOVATION, AND CREATIVITY OF THE AWARD SUBMISSIONS.

*Carrie Johnson, P.E., S.E., Chair, 2022 Awards Committee*

## 800 FULTON MARKET

CHICAGO, IL | SKIDMORE, OWINGS & MERRILL



800 Fulton Market is a mixed-use office building marking the gateway to one of Chicago’s most dynamic neighborhoods. With setbacks and landscaped terraces, the 19-story design is proportioned to the Fulton Market District’s historic low-rise streetscape while connecting to the higher-density commercial district to the north. The building presents a bold structural expression, with external steel braced frames on the east and west facades, designed to resist wind loads while accommodating Chicago’s extreme temperature variations.

## WHARF PARCEL 8

WASHINGTON, D.C. | SK&A STRUCTURAL ENGINEERS, PLLC



Wharf Parcel 8 is a 13-story mixed-use building. Situated over an active tunnel, surcharge on the tunnel and vibration/acoustics were important. Above grade, the hotel on the west side slopes outward at approximately 60 degrees. As the hotel continues to cantilever out, the residential east side also steps back at every floor, creating a wedding cake-type structure. Each floor plate geometry was different, and the center of mass for each floor continuously changed, creating internal stability challenges.

## 66 HUDSON BOULEVARD – “THE SPIRAL”

NEW YORK, NY | WSP USA



“The Spiral” is a 66-story supertall commercial tower featuring signature terraces spiraling up the exterior resulting in unique floor plates for every level. The complex design included a repeating multi-story column-sloping system (inward and outward), resulting in horizontal forces in different directions on a floor. Horizontal floor trusses stabilize and transfer forces to the core. As the EOR, WSP performed 100% of the steel Tekla modeling in-house and the connection engineering in conjunction with CSD Engineers.

## MICROSOFT SILICON VALLEY CAMPUS

MOUNTAIN VIEW, CA | HOLMES



Microsoft’s commitment to fostering a deeply sustainable community resulted in North America’s largest mass timber building. The innovative structural design overcame a lack of code provisions – setting a precedent for more mass timber construction in the broader United States. The upgraded Silicon Valley Campus hosts 2,000 employees with new fitness, wellness, and technology centers, a theater, cafes, a parking garage, and an extensive living roof. Holmes provided structural alongside fire engineering to deliver this mass timber milestone.



## I-579 URBAN OPEN SPACE CAP

PITTSBURGH, PA | HDR

The I-579 Urban Open Space Cap project created a unique 3-acre park spanning the interstate between Pittsburgh’s Lower Hill neighborhood and the downtown business and cultural center. The park remedies historical development that harmed the predominantly African American neighborhood. It integrates green infrastructure, elements by Hill artists, Hill District history story walls, performance and green spaces, an outdoor classroom, and so much more. “Frankie Pace Park” honors a Hill District civic leader and longtime champion of the poor.

## 400-430 CALIFORNIA STREET VOLUNTARY SEISMIC RETROFIT

SAN FRANCISCO, CA | DEGENKOLB ENGINEERS



400 California, a San Francisco Designated Landmark constructed in 1908, was evaluated and seismically retrofitted using nonlinear response history procedures following ASCE 41-17. To improve seismic performance with minimum impact on the exterior and interior historic features, the roof level of the building was connected to the structurally separated but functionally connected adjacent 21-story tower using rotational friction dampers. This project is the first application of the Damptech rotational friction damper device in the U.S.

## ADAPTIVE REUSE OF THE HISTORIC WITHERSPOON BUILDING

PHILADELPHIA, PA | PENNONI



The 11-story Witherspoon Building is on the National and Philadelphia Registers of Historic Places and is considered to be Philadelphia's first "skyscraper." Constructed with Carnegie Steel beams between 1895 and 1897 for use by Presbyterian Church groups, this adaptive reuse project primarily included converting an office building to residential units. Several interesting and unique aspects presented many engineering challenges. Two especially unique aspects included the fourth-floor transfer and roof trusses and the built-up "Gray" columns.

## 520 SOUTH EL CAMINO REAL

SAN MATEO, CA | TIPPING STRUCTURAL ENGINEERS



520 South El Camino Real has been radically transformed into a modern, resilient workplace. This retrofit demonstrates that detailed seismic simulations coupled with an innovative design approach can result in unconventional solutions that create extraordinary value. The structural improvements addressed critical seismic concerns and reinvented, modernized, and extended the life of the building, all while controlling cost. Moreover, the engineering approach and strategies are replicable for similar seismically-vulnerable non-ductile concrete buildings.

## THE GEMMA APARTMENTS (PHASE I & II)

LOS ANGELES, CA | LABIB FUNK + ASSOCIATES



Jamison Properties enlisted a project team to breathe new life into the existing structure at 3540 Wilshire – a thirteen-story, 1950s office building. The project seismically upgraded the building and preserved its steel-framed structure, bringing 206 live/work apartments to the upper floors and retail space to ground level while maintaining the original building's mid-century character. The project also added 5 stories above its non-ductile concrete parking garage, retrofitted during the project, creating 123 additional units.

## UC BERKELEY, BAKAR BIOENGINEERING HUB

BERKELEY, CA | FORELL ELSESSER ENGINEERS



Courtesy of Bruce Damonte

Bakar BioEngineering Hub transforms a historically-significant former art museum from a structurally-deficient inoperable space into a coworking life science lab. The design, including a glass-fronted addition, modernizes the highly irregular 1971 building while honoring its original brutalist design. The team converted the upper-level galleries into glass-fronted labs that overlook dramatic cantilevered ramps hanging in a sky-lit double-height space. The project included a full seismic retrofit using buckling restrained braces located several hundred feet from the active Hayward Fault.