

# ENTRY FORM



## DVASE 2018 Excellence in Structural Engineering Awards Program

### PROJECT CATEGORY (check one):

Buildings under \$5M		Buildings Over \$100M	<b>XX</b>
Buildings \$5M - \$15M		Other Structures Under \$1M	
Buildings \$15M - \$40M		Other Structures Over \$1M	
Buildings \$40M - \$100M		Single Family Home	

Approximate construction cost of facility submitted:	<b>\$107 M</b>
Name of Project:	<b>United Therapeutics Corporate Headquarters Expansion</b>
Location of Project:	<b>Silver Spring, MD</b>
Date construction was completed (M/Y):	<b>July 2018 (projected)</b>
Structural Design Firm:	<b>EwingCole</b>
Affiliation:	<b>All entries must be submitted by DVASE member firms or members.</b>
Architect:	<b>EwingCole</b>
General Contractor:	<b>Whiting-Turner</b>

Company Logo (insert .jpg in box below)



### Important Notes:

- Please .pdf your completed entry form and email to [bsagusti@barrhorstman.com](mailto:bsagusti@barrhorstman.com).
- Please also email separately 2-3 of the best .jpg images of your project, for the slide presentation at the May dinner and for the DVASE website. Include a brief (approx. 4 sentences) summary of the project for the DVASE Awards Presentation with this separate email.

- Provide a concise project description in the following box (one page maximum). Include the significant aspects of the project and their relationship to the judging criteria.

United Therapeutics Corporation's world headquarters, which is located in downtown Silver Spring, Maryland, consists of several multi-story buildings housing a mix of Class-A office space, biotech laboratories and retail. Conceived as a net-zero facility, the Unisphere project sets a new standard of energy performance for commercial office development and environmentally conscious design. Architecturally, the design is informed by the gateway potential of the site and the overall composition of the project takes cues from the massing, forms, and materials of adjacent campus buildings, resulting in a series of curving and rectilinear surfaces with varying scales and capped with a sweeping solar canopy which creates a complete visual entity that spans two city blocks.

The Unisphere will connect directly to existing campus buildings at several floor levels and provides additional collaborative workspace for offices, in-silico labs and meeting rooms. The program includes a 120,000 SF office building, ground level retail, public plaza and a 70,000 SF staff parking garage for 152 cars situated in the middle of multi-story commercial buildings, with frontage onto a major traffic intersection.

Construction systems for the project were approached in the context of an integrated energy strategy to achieve the goal of constructing a Net Zero facility. To optimize energy efficiency in the HVAC systems the decision was made to utilize a concrete superstructure for added thermal mass; however, site constraints, connections to existing buildings, and the building's elliptical shape resulted in the need to design a two-way flat plate concrete floor structure. The floors, which are unique at each level, consist curving non-orthogonal design strips around a large atrium that is integral to the natural ventilation and net-zero energy goals of the project. In order to maximize natural and reflected light into the office zones, the high efficiency curtain wall systems at the building exterior and atrium were sloped, resulting in the slab edges being cantilevered to different lengths at each floor. The priority of maintaining thermal isolation between interior and exterior structure to maximize energy efficiency paired with the need for raised access floors to accommodate electrical/data and air intake for natural ventilation caused complicated detailing with discontinuous floor slabs, several types of split insulated slabs, and multiple steps in slab elevation at each level.

Complex structural steel framing with architecturally exposed connections was utilized at the uppermost level (the Solar Tray, with tapered cantilevers up to 28 feet), along the Southwest side of the building facade (the Solar Wall, framed with HSS outriggers to provide the proper orientation toward the sun) and above the upper level of the parking deck (the Solar Roof, having a sloping/sawtooth framing configuration) to support more than 3000 solar panels for on-site power generation needed to meet the expected building output of 700,000 kWh/year.

The lateral forced resisting system of the building is primarily reinforced concrete shear walls, with steel moment resisting frames at the uppermost level. To preserve the open floor plan and future flexibility desired by the client, shear walls were placed around stair and elevator shafts and back of house areas, resulting in an asymmetric layout that complicated the analysis.

The foundation system is a combination of reinforced concrete spread footings and drilled piers. An underground earth-labyrinth with approximately 1500 linear feet of cast in place concrete demising walls is used for passive heating/cooling through the building's atrium and a central indoor pool at the lower level of the atrium is used to temper the air for the building. As an employee amenity, the pool is also designed for swimming, and is equipped with a telescoping floor that can be activated to create a flat surface suitable for large receptions.

Biofiltration planters, which collect storm water from the upper roofs before it enters the storm sewer system, are also located along the Spring Street side of the building as well as on the 4th Floor between the building and parking garage.

The integrated energy strategy used to deliver this Net Zero facility, coupled with the constraints of the site and existing conditions resulted in a unique building which stressed the importance for early and thorough coordination between all disciplines from schematic design through completion of the project.

- The following 5 pages (maximum) can be used to portray your project to the awards committee through photos, renderings, sketches, plans, etc...



View of the Unisphere from the Northeast - Ground through 6th floors are complete, 7th floor is formed and shored.  
(Oct. 2017)

View of the Unisphere from the Northeast - concrete & structural steel Solar Tray complete, sloped curtain wall installation in progress.  
(Apr. 2018)



Rendering of the Unisphere from the Northeast





Interior view of Atrium looking West at the monumental stair and pool (Nov. 2017)

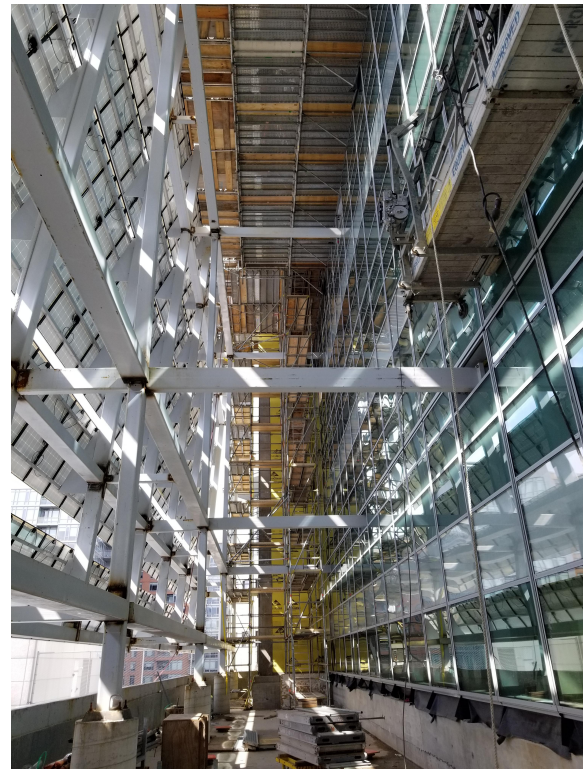


Interior view of Atrium looking West at the monumental stair and pool - interior curtain wall complete (Mar. 2018)

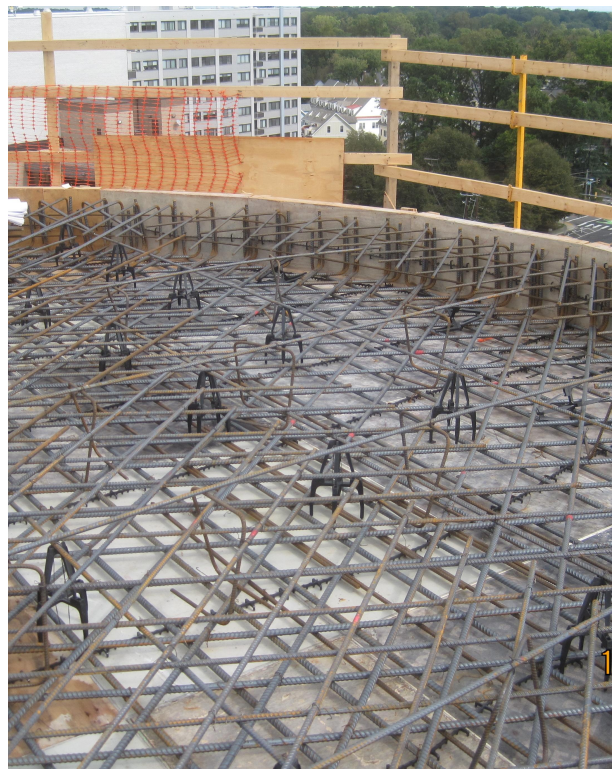


Interior rendering of Atrium looking West at the monumental stair and pool





View between the curtain wall and the Solar Wall structure along the Southwest facade (Mar. 2018)



Example of the intersection of non-orthogonal design strips which complicated concrete reinforcing detailing and placement (Oct. 2017)



View from the West illustrating the many complexities of the building shape and the confined site. (Jul. 2017)





Aerial view of the Unisphere from the Northeast showing the Labyrinth, the pool and the Eastern portion of the Cellar is in progress (Mar. 2017)

Aerial view of the Unisphere from the Southwest showing the Labyrinth partially complete, the Western portion of the Cellar in progress and the Eastern portion of the Ground floor form work (Apr. 2017)



Aerial view of the Unisphere from the Northeast showing the Ground floor complete, 2nd through 4th floors in various stages of progress (Jul. 2017)



Aerial view of the Unisphere from the Southwest showing the Ground through 6th floors complete, 7th floor and Solar Tray structural steel framing erection in progress (Oct. 2017)



Aerial view of the Unisphere from the Northeast showing the Ground through 7th floors complete, Solar Tray structural steel framing erection nearly complete and curtain wall installation in progress (Dec. 2017)

Aerial view of the Unisphere from the Southwest showing the primary structure essentially complete, solar panel installation at the Southern Solar Wall and Solar Roof above the parking deck in progress (Mar. 2018)





By signing, signatory agrees to the following and represents that he or she is authorized to sign for the structural design firm of record.

*All entries become the property of DVASE and will not be returned. By entering, the entrant grants a royalty-free license to DVASE to use any copyrighted material submitted.*

*If selected as an award winner, you may be offered the opportunity to present your project at a DVASE breakfast seminar. Would you be willing to present to your colleagues?*    ☐ **YES**    ☒ **NO**

Submitted by:

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