ENTRY FORM

DVASE
2019 Excellence in Structural Engineering Awards Program

PROJECT CATEGORY (check one):

Buildings under $5M		Buildings Over $100M	
Buildings $5M - $15M		Other Structures Under $1M	
Buildings $15M - $40M		Other Structures Over $1M	
Buildings $40M - $100M	X	Single Family Home	

Approximate construction cost of facility submitted:	**$46 M**
Name of Project:	**LUNG BIOENGINEERING 2**
Location of Project:	**JACKSONVILLE, FL**
Date construction was completed (M/Y):	**JUNE 2019**
Structural Design Firm:	**EWINGCOLE**
Affiliation:	**All entries must be submitted by DVASE member firms or members.**
Architect:	**EWINGCOLE**
General Contractor:	**WHITING TURNER**

Company Logo (insert .jpg in box below)

Important Notes:

- Please .pdf your completed entry form and email to 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.

Lung Bioengineering 2, a subsidiary of United Therapeutics Corporation, is a new facility for the Rehabilitation of Lungs suitable for transplant on the campus of the Mayo Clinic in Jacksonville, Florida. This new building, now under construction, will be a state of the art facility that will increase the number of transplantable organs within the region. The building's program includes the procedure rooms for organs, associated supporting spaces, staff spaces, and a bio-incubator facility for medical research.

One of the main goals for the project involved designing a Net-Zero building with required systems to produce on-site energy. These systems included solar arrays and geo-thermal heat exchangers. Additionally, the three-story reinforced concrete structure that is now under construction includes designs for future vertical expansion of an added five stories for a total of eight stories.

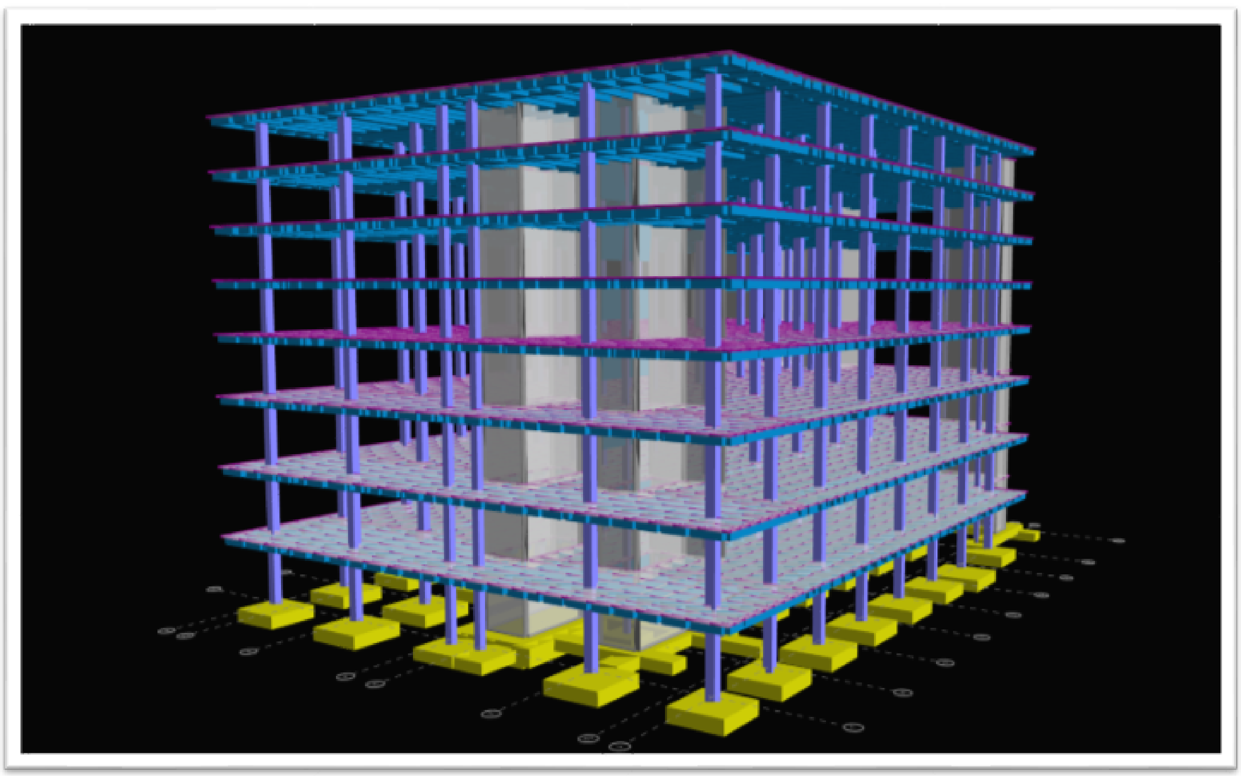
Several criteria influenced the structural design. Campus standards dictated that the superstructure consist of reinforced wide-module concrete joists and girders supported by reinforced concrete columns and walls. This floor construction was desirable for its inherent fire rating, cost effectiveness, and repetitive nature which proved beneficial to the construction schedule. To accommodate the high ceiling heights, while still allowing space for MEP, the floor construction could not exceed 20.5 inches deep. This became particularly challenging at the north end of the building where live loads increased for mechanical rooms and girders spanned over 32 feet.

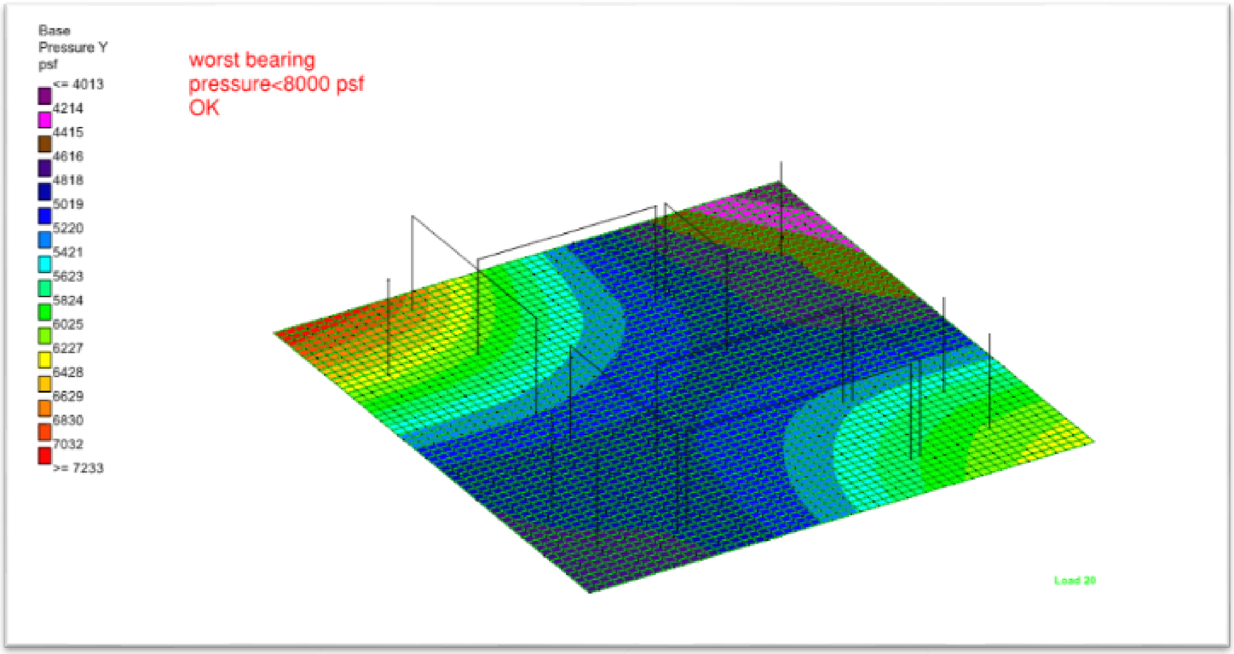
The owner requested unimpeded views to the outside from the perimeter corridor, which resulted in pulling columns away from the exterior and introducing cantilevers on the east, south, and west facades for all supported floors. Vertical deflection of the nearly eight foot cantilevers was limited to a maximum of 3/8-inch. This limitation demanded critical long-term creep calculations around the perimeter of the building.

To provide interest at the façade, the architects introduced a setback in the curtainwall of several feet below the second floor. This architectural condition required the addition of diagonal steel angles which were carefully coordinated with mechanical ductwork running above the ceiling and around the perimeter of the building. Close coordination with mechanical engineers and architects produced a solution utilizing a combination of resized ducts, local soffits, and eccentric steel connections.

At the foundation level, the soil on site had an allowable bearing pressure of only 2000 psf, which building upon would have resulted in settlements of over two inches for standard shallow foundations supporting the future eight-story building. Multiple foundation options were considered to reduce the expected significant settlement. Deep foundations using auger cast piles and shallow foundations bearing on soil improved with vibro-replacement were among the options considered. Ultimately, geotechnical engineers recommended shallow foundations bearing on soils improved using vibro-replacement. During this procedure, a probe penetrates the sandy soil, producing horizontal vibrations. Water-jetting accompanies the vibrations while backfill stone is added to densify the soil. This ground improvement resulted in an allowable bearing capacity of 8,000 psf, which allowed for conventional spread footing design with sizes around 12'x12'. STAAD's finite element analysis was used in the design of mat foundations under shear wall groups and elevator pits.

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

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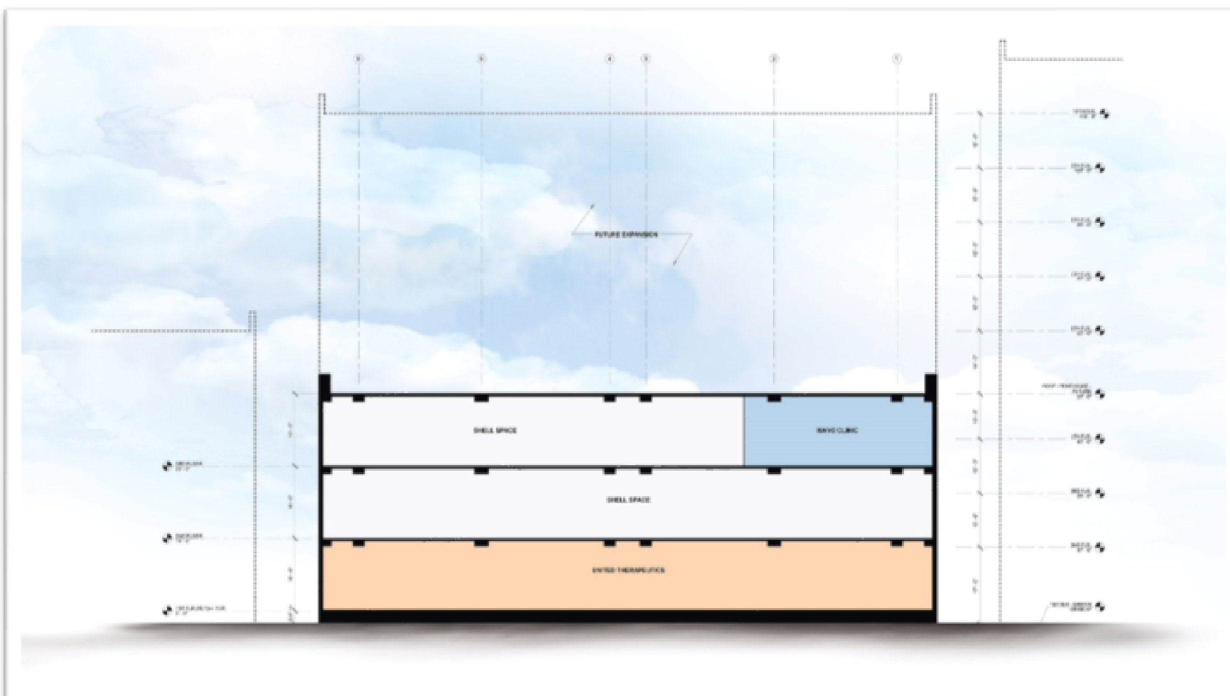

By signing, signatory agrees to the following and represents that he or she is authorized to sign for the structural design firm of record.

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:

Print name: KRISTINE KEARNS	**Signature:**	**Date:** 3/21/2019
Submitting Firm:	EWINGCOLE	
Mailing address:	100 N. 6TH ST. PHILADELPHIA, PA 19106	
Telephone: 215.625.4642	**Fax:** 215.574.9163	**Email:** kkearns@ewingcole.com