Design of a Large Scale Structure
Architectural Rendering
To design a sustainable modern and efficient residential building on Illinois Institute of Technology’s campus, replacing an outdated and unsightly graduate dorm.

Use advanced design techniques to facilitate both the initial design and subsequent revisions.
Team Organization

- **Structural Design & Analysis**
  - Responsible for design of a complete structural system incorporating precast structural concrete.

- **Foundations**
  - Responsible for the analysis of existing soil conditions and design of a foundation system and basement structure for the proposed building.
  - Responsible for design of an earth retention structure.
Limitations

For sustainability and efficiency, use precast concrete as much as possible.

Building design was determined by architects of IPRO 335, featuring:

- Staggered towers at levels 13, 14, 17
- Large atriums
- Balconies
- Green roof
- Heavy mechanical equipment at roof and basements
Structural Design & Analysis

- Gravity Load Bearing System
  - Hollowcore precast and cast-in-place floor slabs
  - Precast and cast-in-place beams
  - Cast-in-place columns

- Lateral Load Resisting System
  - Shear wall and moment frame dual system
  - Integrated columns to make walls non-load-bearing
Structural Layout

Floors 2-13
Structural Layout

Floor 14

Floors 15-17
Selection of Foundation System

- Drilled reinforced concrete caissons extending to the hardpan layer
- Sheet pile retaining structure and dewatering system to allow construction below the ground water table
- Construction methods used to minimize site impact and disturbances to surrounding area.
Foundations

- Research and analysis of existing conditions
  - Obtained soil boring logs from MTCC construction defining the properties and depth of the soil strata.
  - Acquired existing site plan and utilities map from IIT Facilities department

- Design of foundations and sheet pile
  - Drilled shaft foundations and connecting grade beams were designed using ACI 318-08 and CBC.
  - Sheet pile retaining wall structure designed using computer programs
Foundation Layout