

**Cost**

Total Project: \$72,000,000  
Construction: \$51,300,000  
MEPT Const: \$13,000,000

**Owner**

University of Iowa  
Charles F. Saxton, PE  
Sr. Construction Project Manager  
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**User**

University of Iowa  
Steve McGuire  
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**Team**

Principal in Charge  
Amy Infelt, PE, LEED AP  
Project Manager  
Amy Infelt, PE, LEED AP  
Mechanical Engineer  
Justin Opperman, PE, LEED AP  
Electrical Engineer  
Eric B. Bruxvoort, PE  
Design Architect  
Steven Holl Architects  
New York, New York  
Chris McVoy, Senior Partner  
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**Project History**

This new 126,000 square foot home for the University of Iowa School of Art replaces the existing studio arts facility lost to a flood in 2008. The building provides studio arts space, including sculpture, metals and jewelry, ceramics, printmaking painting and drawing, intermedia and 3D design studios, gallery, classroom, auditorium, seminar and administrative spaces.

Design Engineers collaborated closely with the architects at Steven Holl and BNIM and the engineers at TransSolar to integrate the mechanical and electrical systems into the design concept. The integrated design process included specialty design consultants from:

- Sustainable and Climate Engineers:  
TransSolar, Stuttgart, Germany and New York, NY
- National Structural Engineer:  
Buro Happold, Los Angeles, CA,
- Local Structural Engineer:  
Structural Engineering Associates, Kansas City, MO
- Lighting Designer:  
L'Observatoire International, New York, NY
- Code Consultant & CFD Modeling:  
FP&C Consulting, Kansas City, MO
- Audio Visual: The Sextant Group, Omaha, NE
- Acoustical: The Sextant Group, Falls Church, VA
- Commissioning: SSRcx, Lisle, IL

The installation of the activated-slab heating and cooling system in the bubble-deck structural slab required especially close coordination. The project also featured very high goals for energy efficiency. *Overall, the building is projected to use 60% less energy than a code compliant building.*



The project includes a four-story atrium winding through the building enclosed at the top by a large skylight. The skylight is provided with a fixed shading device that is designed to admit the optimum amount of daylight while minimizing the amount of solar gain in the atrium area. The project team code consultant provided CFD modeling to optimize the design of the atrium smoke control system, which in turn allowed Design Engineers to minimize the impact of the smoke control system on the aesthetics of the featured atrium space.

#### **HVAC System Design**

One of the unique features of the project is its heating system. All of the heat required for the building is provided by harvesting waste heat from the building's core and from other the campus buildings. Heat recovery chillers are used to extract heat from the campus chilled water system. A byproduct of this process is chilled water which is returned to the campus chilled water loop which in turn allows it to be used in other buildings.

The heating, ventilating and air conditioning strategy implements a combination of three systems:

1. An activated slab heating and cooling system consisting of PEX piping poured into the underside of the slab. The slab heating and cooling system is essentially a passive system with minimal active control. There is no insulation installed in the concrete so that the thermal mass of the concrete is part of the system. The routing of the PEX piping required close coordination with the voids within the structural slab.
2. Supplemental heating and cooling systems in the form of ventilation air cooling via variable air volume terminal units, radiant perimeter heat installed in the slab and fan coil units.
3. Exhaust and outdoor air systems to provide exhaust as required per code and by equipment and processes and outdoor air as required for replacement air for exhaust systems, ventilation air for compliance with ASHRAE 62.1 indoor air quality standard and pressurization air to maintain the building positive relative to outside.

#### **Awards**

2017 ENR Awards

Higher Ed Best Project

2016 Interior Design

Best of the Year Award: Education

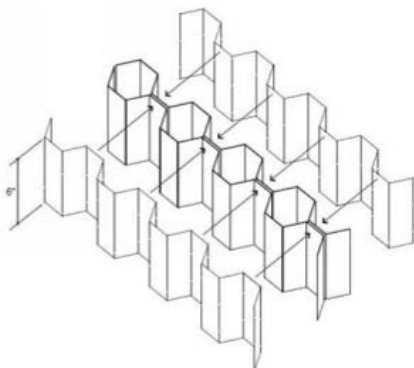
2016 Architect's Newspaper

Building of the Year Award: Midwest

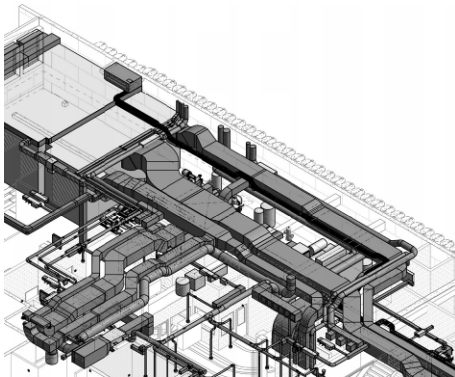
2017 AIANY Honor Award

2017 Chicago Athenaeum

American Architecture Prize



3D View of Fixed Shading Device



3D View of Custom AHU and Ductwork

*"We have been blessed with terrific architects – Holl Architects – and have a beautiful building that inspires art production. And, when we walk in day one, fall 2016, our curricular program will thrive, because of Design Engineers' successful engineering of the building.*

*My observation is that, like me, the architects believe Design Engineers to be in a league of their own. They work well with both architects and users and inspire confidence across the design team with knowledge, thoroughness and consultation."*

Steve McGuire  
School of Art & Art History  
University of Iowa

### **Specialized Air Handling Unit Supply and Exhaust Systems**

The outdoor air provided for both ventilation and replacement air is pretreated by a custom air handling unit with separate sensible heat pipe and total energy recovery wheel air streams.

Design Engineers collaborated closely with the users throughout the design process to address the special requirements of air systems to support a Studio Arts environment. All of the mechanical systems are controlled by a direct digital control building automation system.

### **Electrical Design**

The electrical distribution has been designed to mitigate arc-flash hazard ratings. SKM, a power systems modeling software, was used by the design team to conduct multiple preliminary studies to determine the most effective solution and work within the space available.

An extensive sub-metering system was provided to meter general use lighting, plug loads and HVAC loads. These meters have been integrated with the building's temperature controls system for logging and trending energy usage. This identifies potential energy savings while tracking performance.

### **Lighting System Design**

Many fixtures in the building utilize LED technology for their reduced wattage and long life. The networked lighting control system is an addressable system with a graphical user interface and is integrated with the building automation system. The lighting controls are flexible and customizable with capabilities for both local and remote programming.

### **Fire Protection Design**

The many specialty processes that occur in studio arts required close coordination with the code consultant to ensure compliance with all required codes. To maintain the desired aesthetics, specific routing is indicated for all sprinkler piping. The fire alarm system provides voice notification throughout the facility and is integrated with the atrium smoke control panel and the dry sprinkler system provided for the loading dock.

### **BIM Coordination**

The unique layout of the building combined with the character of the high loft like open spaces required close coordination of all of the mechanical and electrical systems. Revit was used extensively for modeling the complex structure of the building and 3D views were included in the finals plans to help convey the required scope of work.

**TRIVIA**

**48** million pounds of concrete were used in construction.

**5** floors, each dedicated to different academic areas like printmaking, which is ranked the third best program of its kind in the nation by U.S. News & World Report

**3-5-8** A variety of 3, 5, and 8-foot square windows are strategically sprinkled throughout to deliver natural light for the students, faculty, and staff inside.

**67** miles of tubing filled with 20,000 gallons of treated water is used to heat and cool the building



**100%** thermally-active radiant slab flooring – an innovative, sustainable method used by only a few buildings

**16,000** square feet of green, energy-efficient roofing.

**15** kilns capable of up to 2,000 degrees are on site

**2,000** students take an arts class each academic year.

**20** Graduate painting and drawing students have access to private studios, none of which are the same size or shape or have the same amount of natural light



**300+** interactive performances, workshops, readings, residencies, and master classes are coordinated statewide annually by Arts Share.

**3** Entrances have handles in the shape of the building fabricated by UI art students.

**5** new galleries inside the Visual Arts Building will allow the School of Art and Art History to host more than 180 exhibitions during the fall and spring semesters