ART BUILDING REPLACEMENT
UNIVERSITY OF IOWA
Iowa City, Iowa

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
319.335.5496
Charles-Saxton@uiowa.edu

User
University of Iowa
Steve McGuire
Professor, Studio Division
Coordinator, Summer Director
School of Art and Art History
319.335.3011
s-mcguire@uiowa.edu

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
212.629.7262
chris@stevenholl.com
Associate Architect:
BNIM
Des Moines, Iowa
Rod Kruse, FAIA, LEED AP
515.974.6462
rkruse@bnim.com

Awards
2017 ENR Best Midwest Higher Ed
2017 AIANY Honor Award
2017 Chicago Athenaeum
American Architecture Prize
2016 Interior Design
Best Of The Year - Education
2016 Architect's Newspaper
Building Of The Year: Midwest

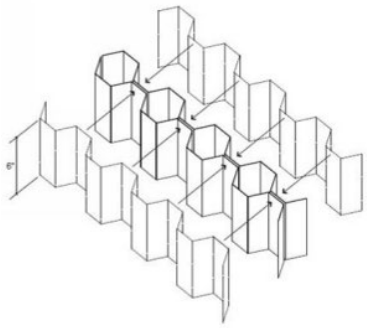
Project History
This new 126,000 square foot home for the University of Iowa School of Art to replaces the studio arts facility lost to a flood in 2008. The building will provides studio arts space, including sculpture, metals and jewelry, ceramics, printmaking painting and drawing, intermedia and 3D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

Design Engineers collaborated closely with the architects at both Steven Holl and BNIM to integrate the mechanical and electrical systems into the context of the overall design. Design Engineers also worked closely with the other specialty design professionals to determine the best solutions for each application:
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.

DESIGN ENGINEERS
MECHANICAL & ELECTRICAL CONSULTANTS

ART BUILDING REPLACEMENT
UNIVERSITY OF IOWA
Iowa City, Iowa

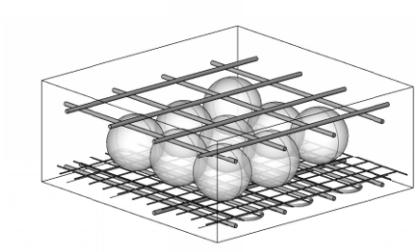


3D View of Fixed Shading Device

"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 Amy and 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



A four-story atrium winding through the building is capped by a large skylight. The skylight's shading device admits the optimum daylight while minimizing solar heat gain. The project code consultant provided CFD modeling to optimize the smoke control system, allowing Design Engineers to minimize aesthetics impact.

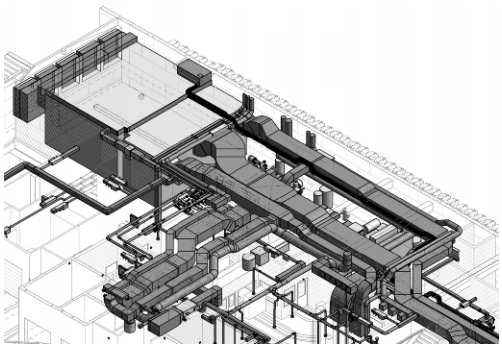
Due to the complex geometry of the atrium and the unique systems applications, thermal modeling was used to inform the cooling and heating system design.

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.

The heating, ventilating and air conditioning strategy uses a unique 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.

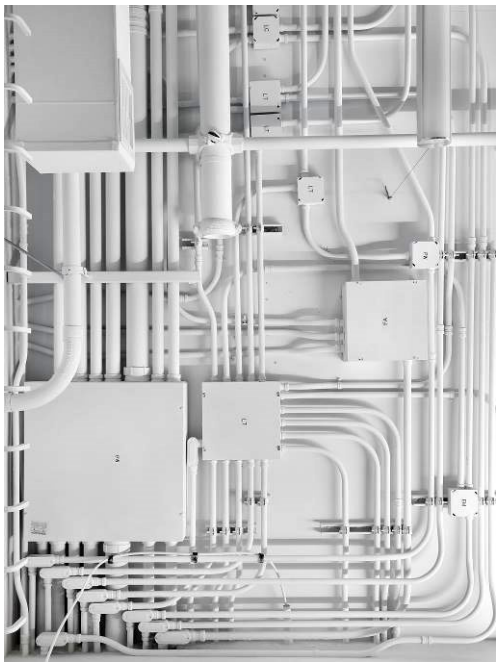


3D View of Custom AHU and Ductwork

In addition, a single zone displacement ventilation system is provided to serve the 76-seat classroom. The displacement ventilation system is utilized because this system supplies air at a low velocity which is very quiet and only conditions the occupied zone closest to the floor, thus reducing the amount volume that needs to be conditioned as well as reducing the outdoor air required for ventilation.

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.

To address the special requirements of the wide variety of systems required to support the many challenging processes that occur in a Studio Arts environment, Design Engineers collaborated closely with the users throughout the design process. Several different specialty exhaust systems are provided in support of the specialized processes that occur in the foundry, metals and jewelry, painting, printmaking and ceramics, including fume hoods, exhaust hoods, snorkels and dust collection systems for woodworking, glazing and metals working processes. Other specialty systems provided include compressed air, natural gas, acetylene, domestic hot and cold water, pure water and acid waste and vent.



All the mechanical systems are controlled by a direct digital control building automation system.

Electrical Design
The electrical distribution has been specifically 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 allocations available. The system is a 3000A, 277/480V service with K-rated dry type transformers for stepping down to 120/208V panel boards. The distribution system also includes a natural gas generator for emergency systems within the building.

An extensive sub-metering system was provided to meter general use lighting, plug loads and HVAC loads. These meters have been designed to integrate with the buildings temperature controls system for logging and trending energy usage. This will allow the Owner to determine where energy savings can be captured as well as help identify if a system is not working as intended.

DESIGN ENGINEERS
MECHANICAL & ELECTRICAL CONSULTANTS

ART BUILDING REPLACEMENT
UNIVERSITY OF IOWA
Iowa City, Iowa

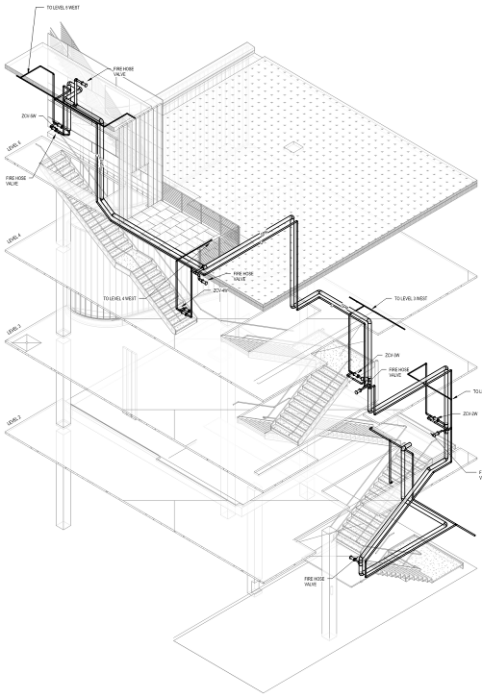
Photo Eric Dean

Lighting System Design

The lighting design includes unique applications and distinctive installation details for standard products that provide a custom appearance. Lighting power densities were reduced to 30% below current energy standards and still met the minimum lighting requirements of IESNA.

Many fixtures in the building utilize LED technology, both for their reduced wattage capability as well as for their long life. Special attention was given to fixture maintenance to assure fixtures are accessible in the future and repairable. Many of the high volume spaces in the building presented lighting challenges that were solved in unique ways.

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. Much of the floor plan was designed to allow natural light to flow through the building, light fixtures that fall within these zones are controlled for automatically dimming to the natural light available.


Axon View of Sprinkler System Routing

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.