

OPTICAL SCIENCE CENTER FOR APPLIED RESEARCH

DELAWARE STATE UNIVERSITY

LOCATION

DOVER | DELAWARE

COMPLETED

JULY 2015

SQUARE FOOTAGE

28,000 GSF



DESIGN INTENT

The prism as an iconic device in optics research, transforming the nature of the light passing through it. In the same way, the building is transformed by its reflective skin as it fades into the landscape and sky, its form being defined and dissolved by ambiguities of perceived solidity and transparency.



DESCRIPTION

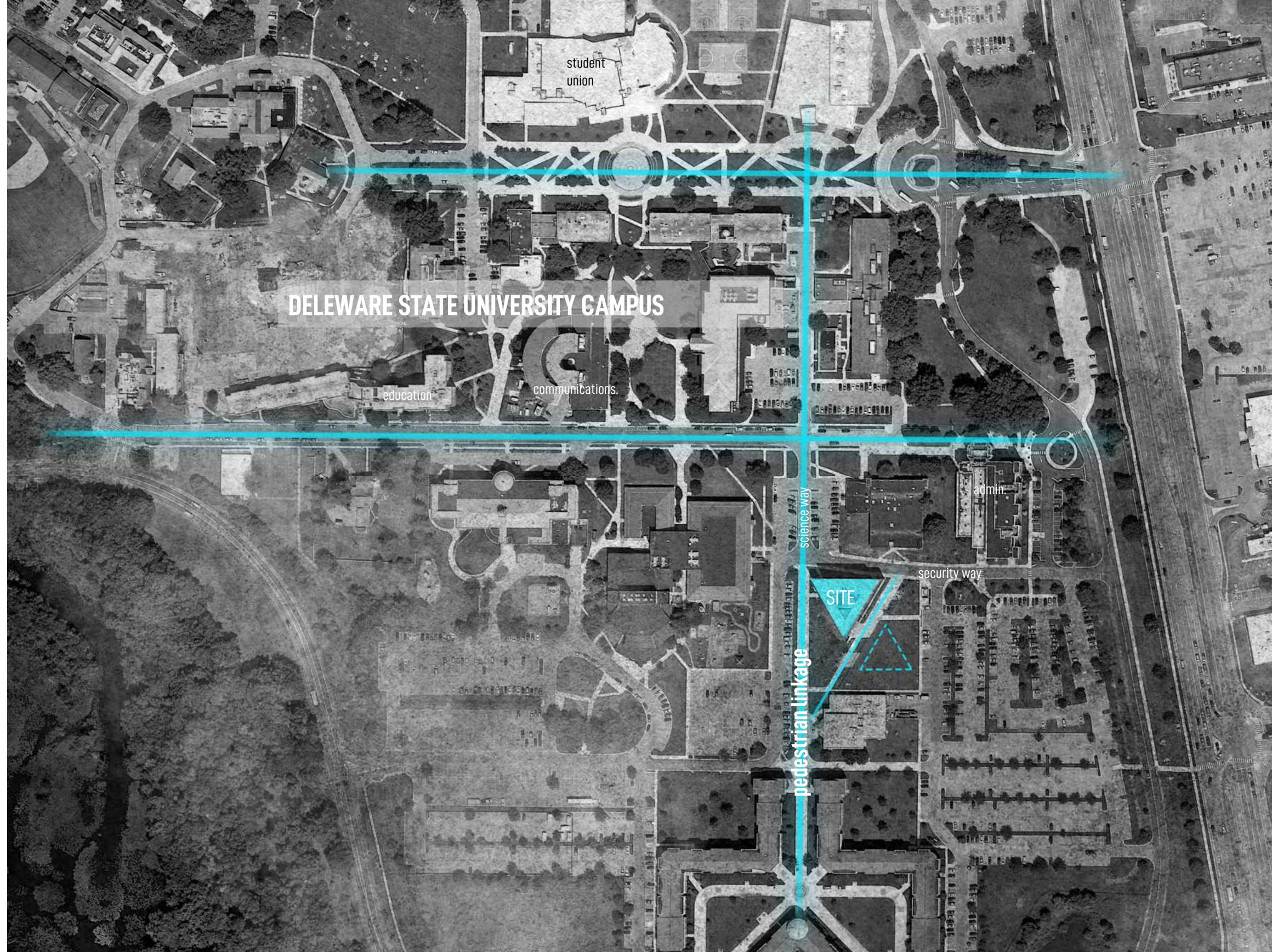
The Optical Science Center for Applied Research is a stand-alone, ground up facility for the research, graduate, doctoral, and post-doctoral, programs in optics within the Department of Physics and Pre-Engineering at Delaware State University. The project is intended to address space requirements for future growth of the optical programs and the addition of new programs and faculty while remedying the inadequacies of the current facilities related to the nature of optical research.

The design promotes a prominent identity for the optics programs at the university to the campus and scientific community at large reflective of the world-class status they have achieved in education and research.



SITE

The overall envisioned program for the project was planned, with completion of the design and construction in two separate, sequential phases. The first phase, now complete, represents that portion of the overall program with the maximum impact for elevating the university's research capabilities and providing the vision for phase II.



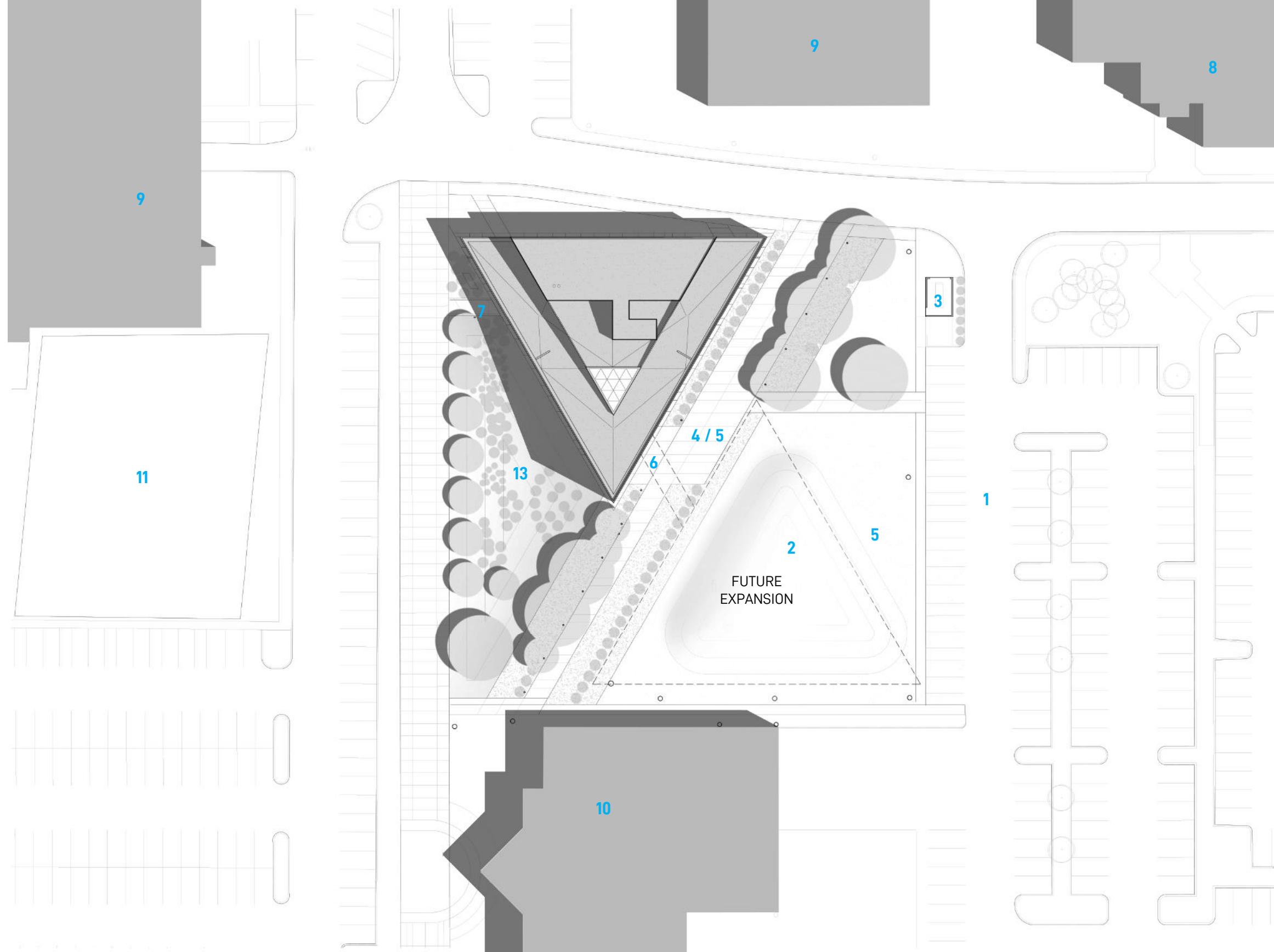
PLANNING

The overall envisioned program was planned for completion in two separate, sequential phases.

- Phase I represents the overall program with the maximum impact, elevating the university's research capabilities.
- Phase II is intended to be an opposing prism form with a bridge connection spanning the primary walkway that bisects the site.

SITE PLAN

1. PARKING
2. EARTHEN BERM
3. EMERGENCY GENERATOR
4. PEDESTRIAN PATH
5. FIRE LANE
6. MAIN ENTRY
7. SERVICE ENTRY
8. ADMINISTRATION BUILDING
9. EDUCATION BUILDING
10. CAFÉ
11. PLAYGROUND
12. BIORETENTION AREA

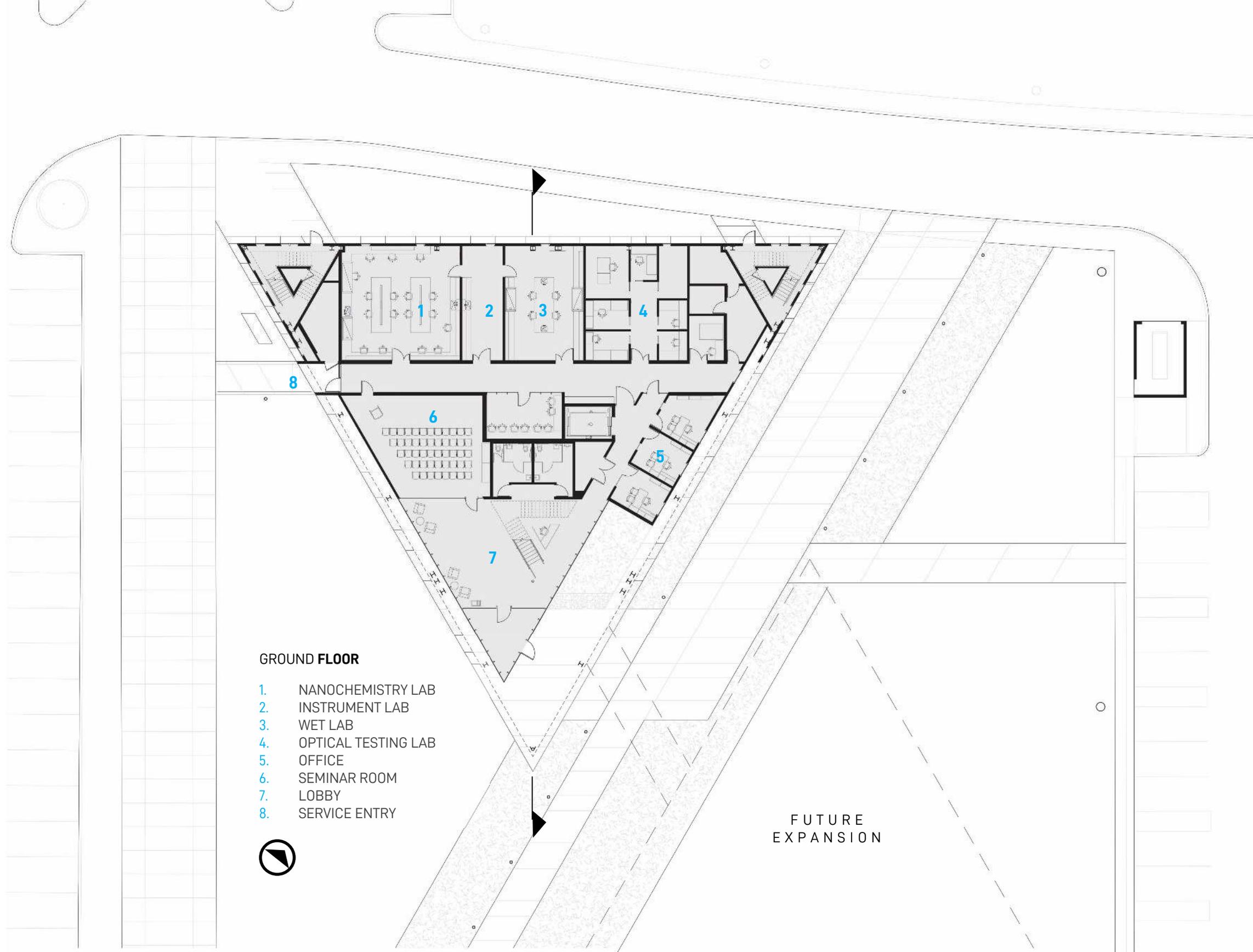


PROGRAM

The Optical Science Center for Applied Research is a new facility for research, graduate, doctoral, and post-doctoral, programs in optics within the Department of Physics and Pre-Engineering at Delaware State University. The project addresses space requirements for future growth while remedying the inadequacies of the current facilities.

Institutional goals for this new facility:

- Elevate optics research programs with a building that creates an identity reflecting the world class nature of the research at DSU
- Consolidate research groups into one facility to collaborate and share resources and amenities
- Open facility to on-site independent and collaborative research by start-up companies developing new technologies.



LOBBY

A central light shaft and communicating stair connects the lobby to upper floors. Circulation on each floor is defined by a continuous edge lit translucent ceiling plane. White finishes enhance the brightness of the interior spaces, making light, contrast, and reflection part of the design palate.



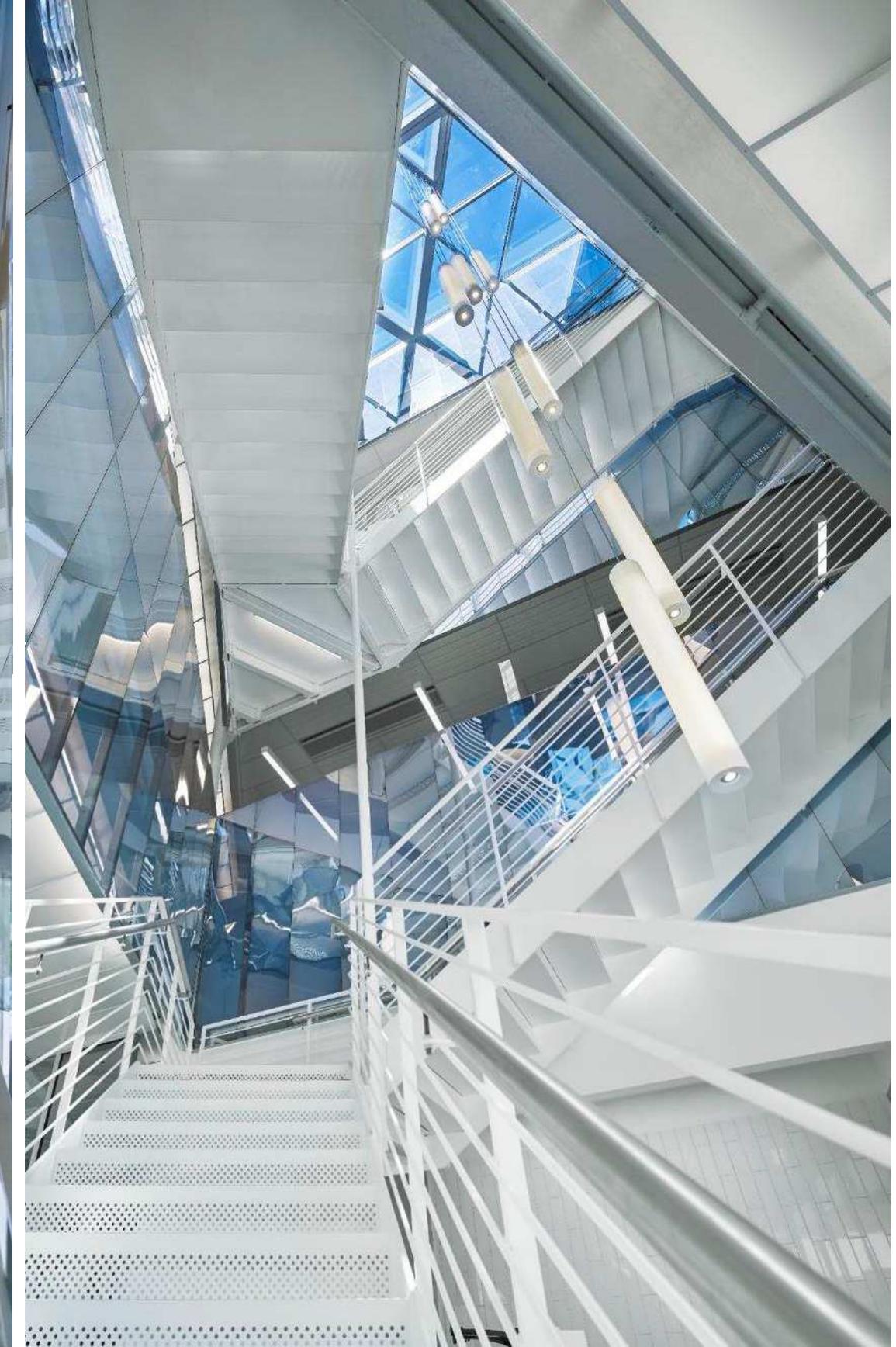
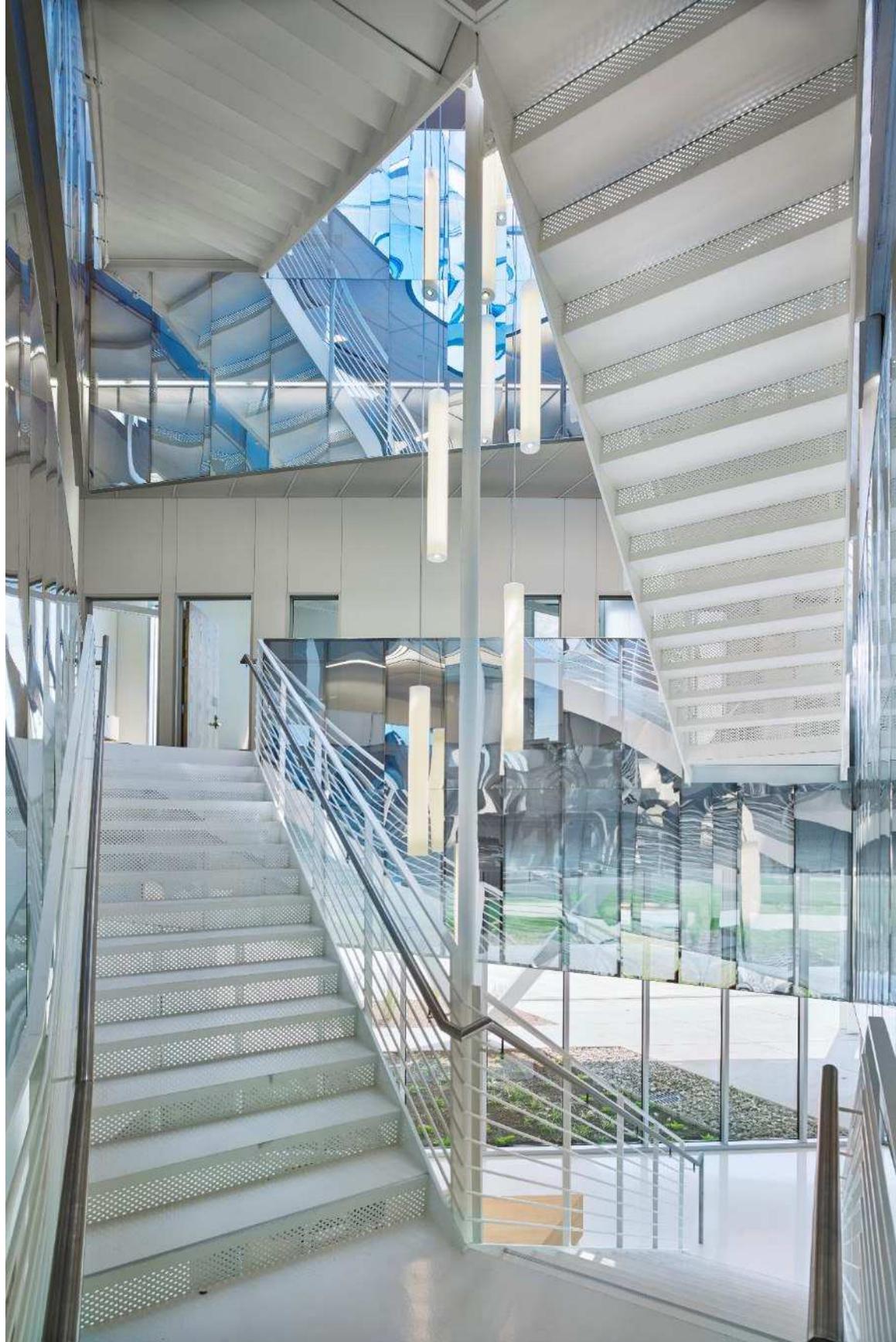
VISUAL CONNECTIONS

The 'forum', a mediated seminar room, allows DSU to host or virtually attend lectures, conferences and other events intended for the sharing of ideas and knowledge. Current research activities of the programs will be showcased in the public spaces within the building as a means of education and outreach.



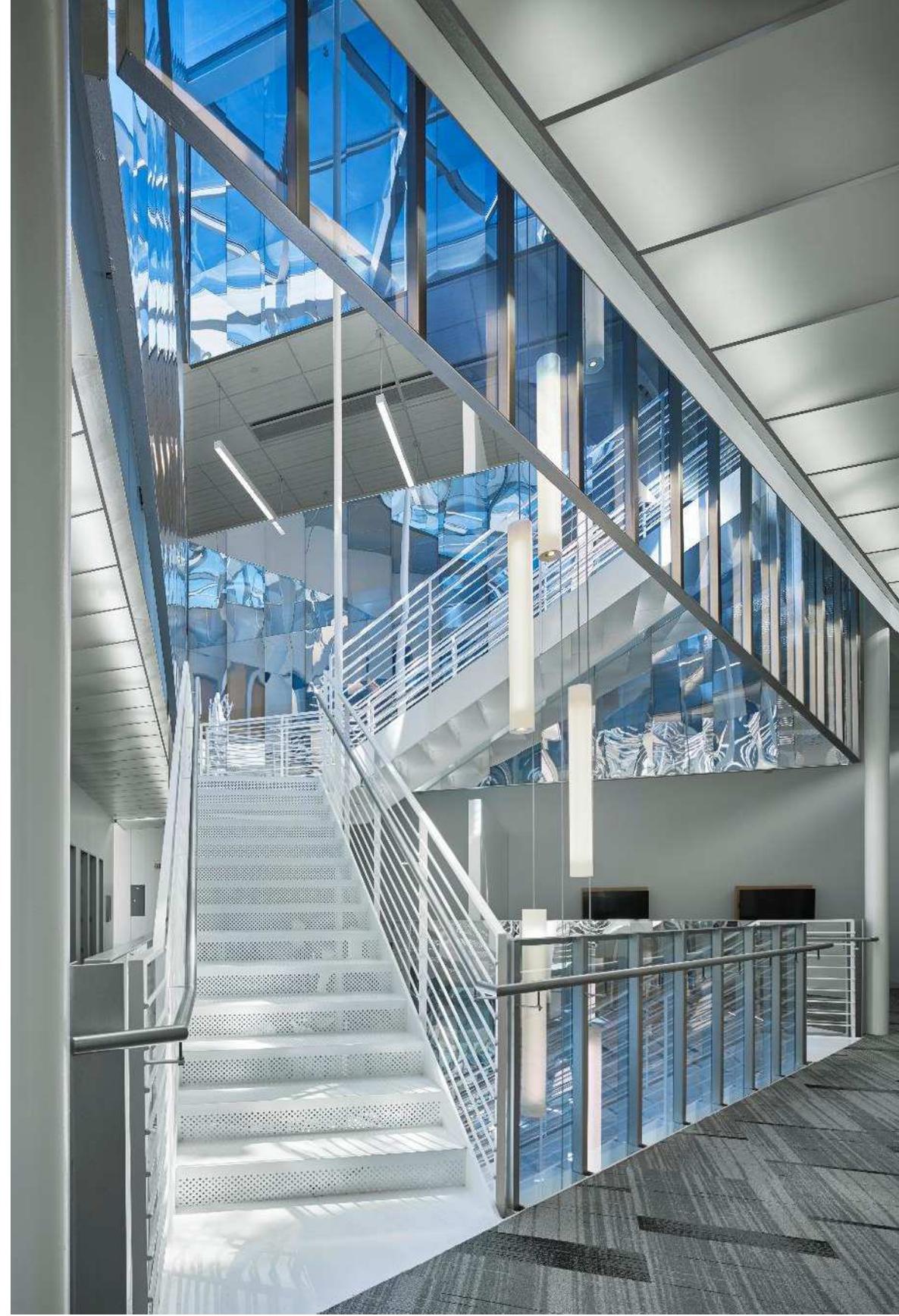
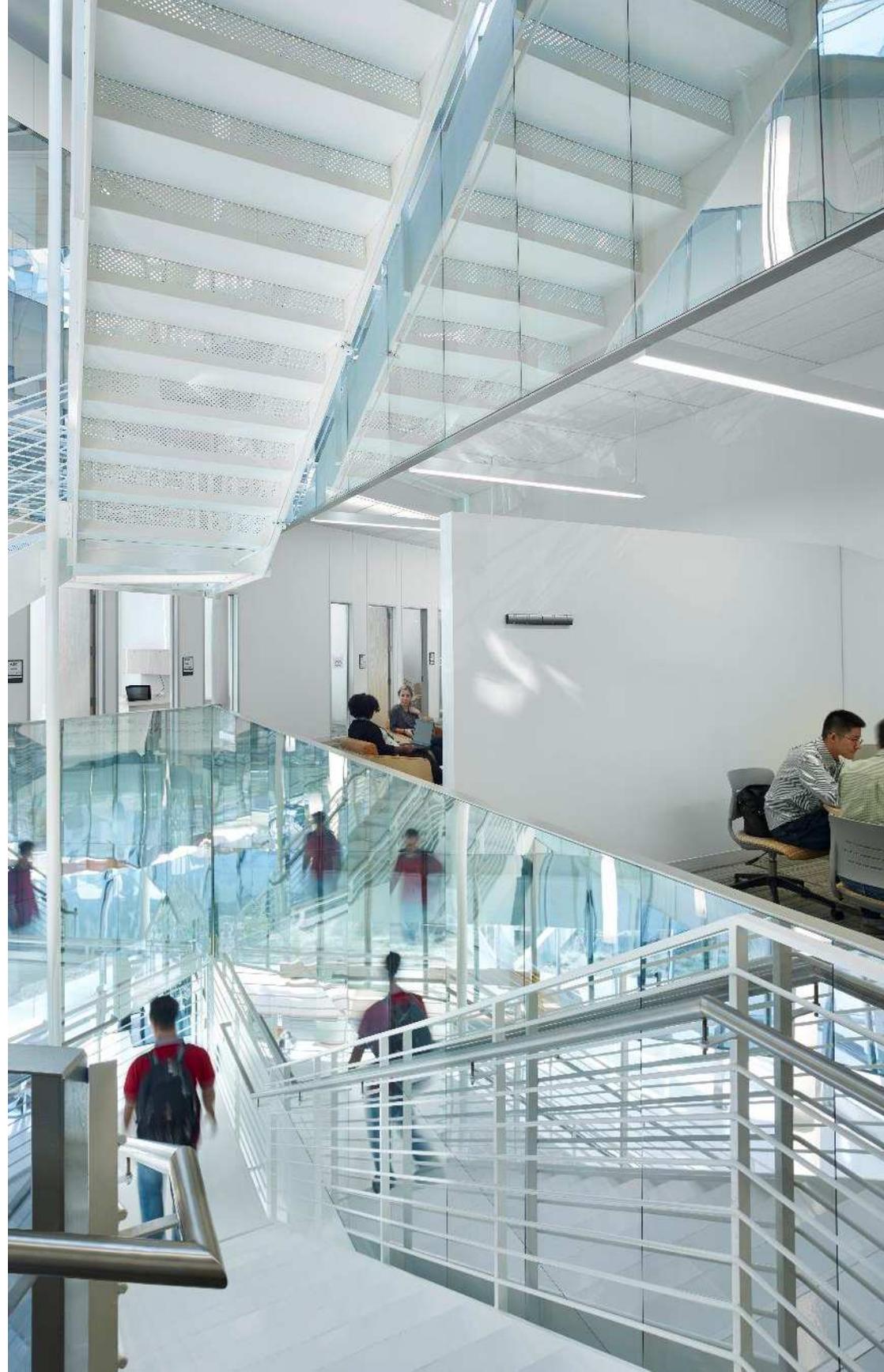
DAYLIGHTING

The main stair is suspended within a light shaft lined with semi-reflective panels extending down from a triangulated skylight.



PRISM

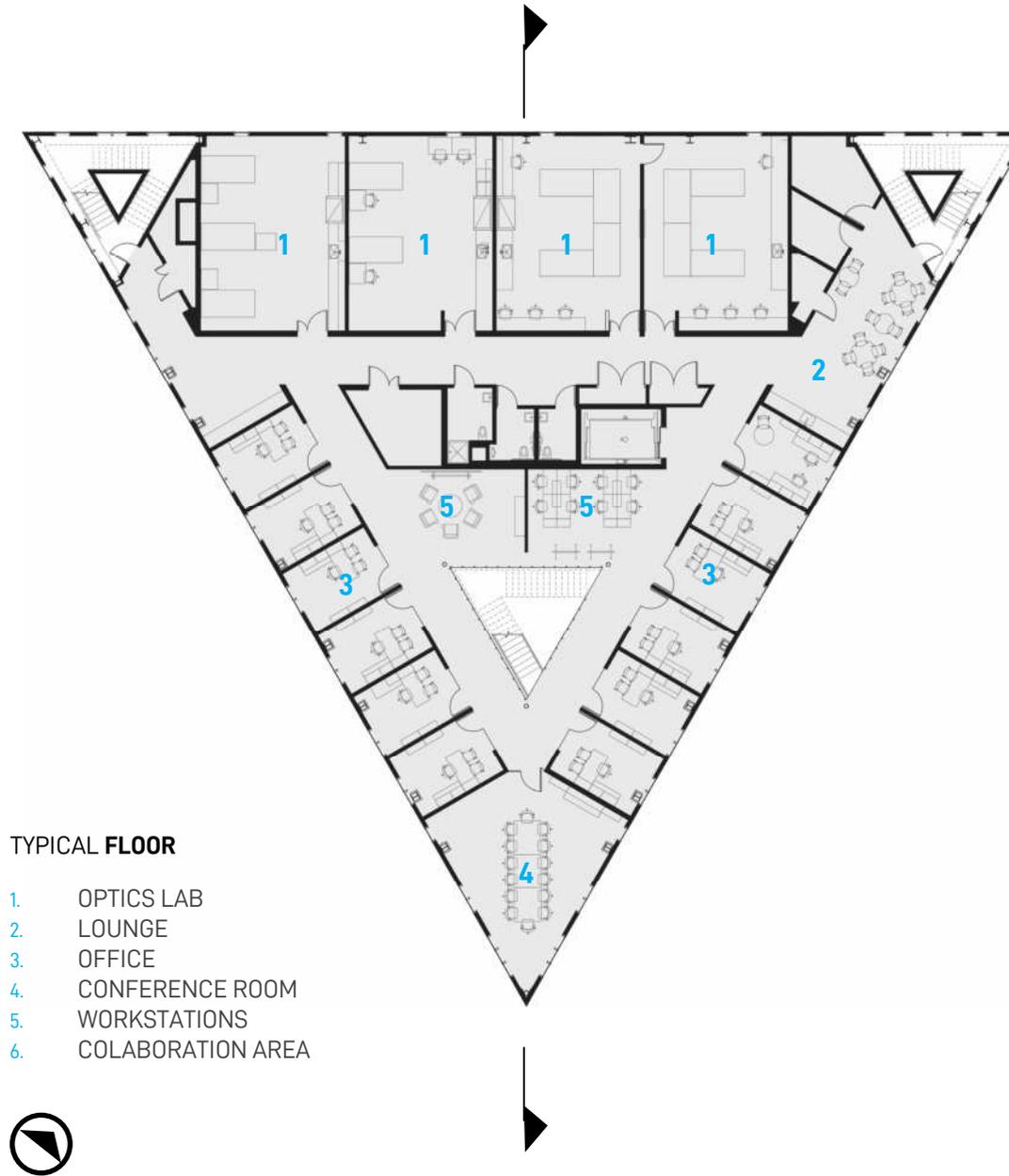
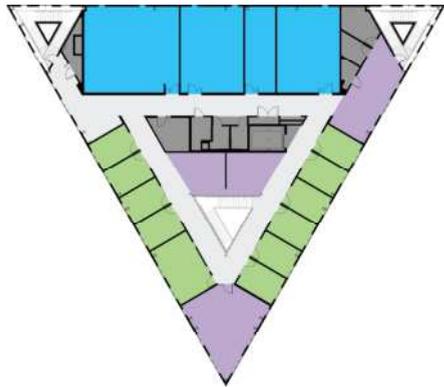
The panels present a visual quality ranging from completely reflective to varying levels of transparency depending on the lighting conditions present creating a dynamic experience when ascending or descending the stair and distributing daylight vertically to core of the building. The liner is broken at each floor level to allow light to escape and cross views.



ORGANIZATION

The two upper floors of the building are similar to the lowest level locating optics laboratory spaces along the north edge while the other two edges and center of the floorplate are dedicated to office related and collaborative functions. This simplified the building's structural and mechanical systems.

- LAB
- OFFICE
- INTERACTION + GATHERING



TYPICAL FLOOR

1. OPTICS LAB
2. LOUNGE
3. OFFICE
4. CONFERENCE ROOM
5. WORKSTATIONS
6. COLLABORATION AREA

INTERACTION

Co-location of the optics programs in a single facility with an interdisciplinary focus promotes and facilitates meaningful interaction. Upper levels include office and meeting space surrounding the central stair. Collaboration spaces are located in the center common area accessible from both offices and laboratories.



SECTION

A hybrid structural system addresses vibration considerations integrating a more robust structural system only at laboratory areas. This provided a significant cost savings to the project.

- Vibration sensitive and service intensive functions are located along the northern edge.
- The southern portion is dedicated to collaborative and public functions.

1. MECHANICAL PENTHOUSE
2. OPTICS LAB
3. INTERACTION SPACE
4. CONFERENCE ROOM
5. WET LAB
6. IMAGE ANALYSIS
7. LOBBY
8. LIGHT SHAFT/STAIR



STRUCTURE

Shared conference rooms are located at the southern vertex of each of the upper levels with views to the lake and greenspace south of the campus. The triangulated braced structural steel frame of the building is seen expressed in these rooms and throughout the building.



RESEARCH

Research laboratories are located along the north side of the building below the systems penthouse at roof level. Windows in labs are limited due to research requirements but become more frequent at office and other non-lab functions.



INTEGRATION

Vibration sensitive laboratory spaces such as nano-chemistry and microscopy are located at the ground level. Laboratory services and building systems are distributed above the finish ceiling and extended in organized utility drops to bench level.

The optics labs were designed using two primary arrangements but integrate flexibility for future reconfiguration. The first as shown provides a single large experiment area .



FLEXIBILITY

A structured platform is suspended above through the finish ceiling providing overhead equipment space and distribution of laboratory services. General lighting is also mounted to this fixture. The rack structure can be easily disassembled and reconfigured as needed per changing needs.



SUSTAINABILITY

- LEED Silver Certified
- Active chilled beams for both heating and cooling are utilized throughout the building as well as central make-up air handling and a modular air-cooled chiller.
- The energy efficient HVAC system is the first of its kind on campus.
- Heat recovery is incorporated into the laboratory exhaust system for additional energy savings.
- Storm water management is provided by minimizing impervious surfaces and creating a significantly sized bio-retention and infiltration area adjacent to the west side of the building.
- Water conservation measures - native plantings that promote shade and usable green spaces that require no long-term irrigation.



MATERIALITY

54' tall structural insulated panels (SIPS) with a polished stainless-steel finish serve as structure, insulation, and exterior finish simultaneously. The reflective façade is lifted at the southern vertex to create the building entrance revealing the structural steel frame and main lobby.

Materials and construction methods were developed with sensitivity toward several factors:

- appearance and articulation within the campus context
- climate and weatherability
- longevity and maintenance
- increased thermal resistance and continuity over traditional exterior wall construction
- executed in one installation



