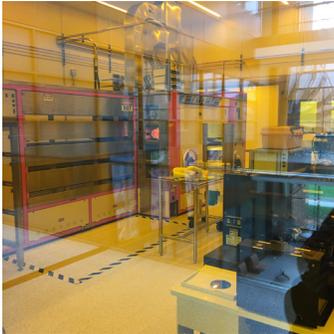


UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

MATERIALS RESEARCH LAB AND HOLONYAK MICRO AND NANOTECHNOLOGY LAB | ENGINEERING DESIGN



PROJECT OVERVIEW

This multi-phase project began with HVAC upgrade feasibility studies for five facilities: the Engineering Science Building, Loomis Laboratory of Physics, Supercon, the Materials Research Laboratory (MRL), and the Holonyak Micro and Nanotechnology Laboratory (MNLT). The MRL and MNLT were chosen for upgrades.

The **MRL project** was a phased HVAC renovation with the building fully occupied.

- Five major air handlers were replaced with two central dual-path (outside and return air), low-velocity AHUs.
- Sixty lab exhaust fans were replaced with three high-plume exhaust fans with heat pipe heat recovery.
- Air distribution was changed from high-velocity dual-duct air terminal to low-velocity displacement ventilation, variable-air-volume systems.
- The MRL project also included a cleanroom renovation, creating a 4,000-square-foot ISO 7 laboratory for student development and manufacturing of silicon wafer integrated circuit boards.
- The renovation achieved utility cost savings of nearly 46% vs baseline, amounting to nearly \$724,000 annually.
- This project was honored with the ASHRAE Illinois Excellence in Engineering Award; the ASHRAE Region VI Technology Award; and the ASHRAE Society Technology Award (First Place).

The **MNLT project** included a 4,000-square-foot renovation to create new ISO 5, 6, and 7 laboratory space for student development and manufacturing of silicon wafer integrated circuit boards, as well as an overall HVAC upgrade for the facility.

- The mechanical design included new air-handling equipment, HEPA and ULPA filtration, toxic and solvent exhaust, high-purity gas distribution, and particulate demand-controlled ventilation.
- Cleanroom equipment installed included wet etching benches, a thermal evaporator, a high-temperature furnace, and photolithography equipment.
- Energy conservation measures recommended for existing cleanrooms were also implemented.
- Energy savings vs. baseline were nearly 35%, or \$812,583 annually.
- This project was honored with the ASHRAE Illinois Excellence in Engineering Award; the ASHRAE Region VI Technology Award; and the ASHRAE Society Technology Award (Honorable Mention).

FACILITY

The Materials Research Laboratory (123,000 square feet, with about 50,000 square feet of lab space) and the Holonyak Micro and Nanotechnology Laboratory (about 147,000 square feet total)

CONSTRUCTION COST

\$20 million (\$15 million for the Materials Research Laboratory; \$5 million for the MNLT)

PROJECT

Engineering analyses of five buildings in the College of Engineering, followed by HVAC upgrades and the creation of a new cleanroom facility (two buildings involved). GBA collaborated with energy performance contractor Energy Systems Group on these projects.