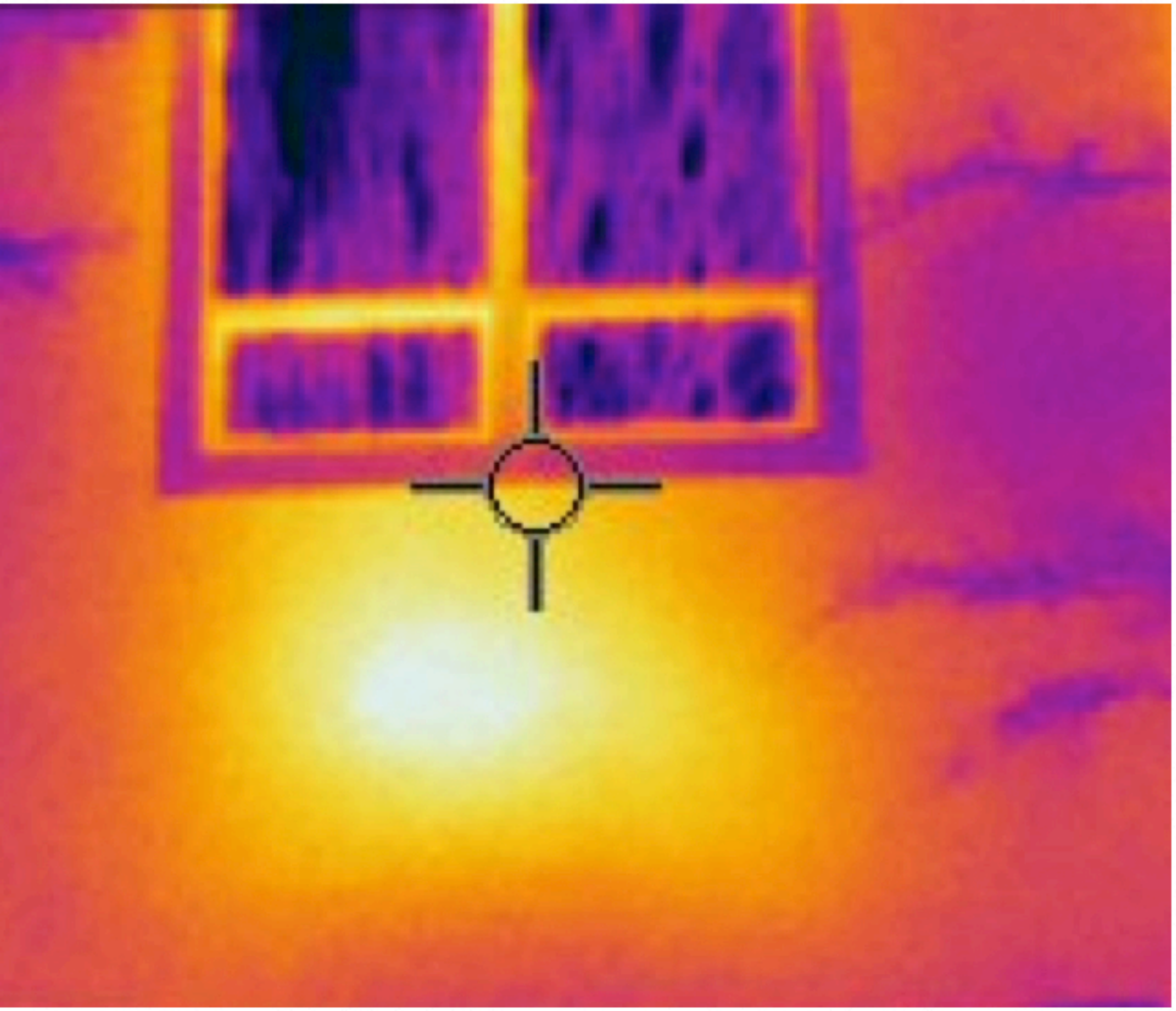
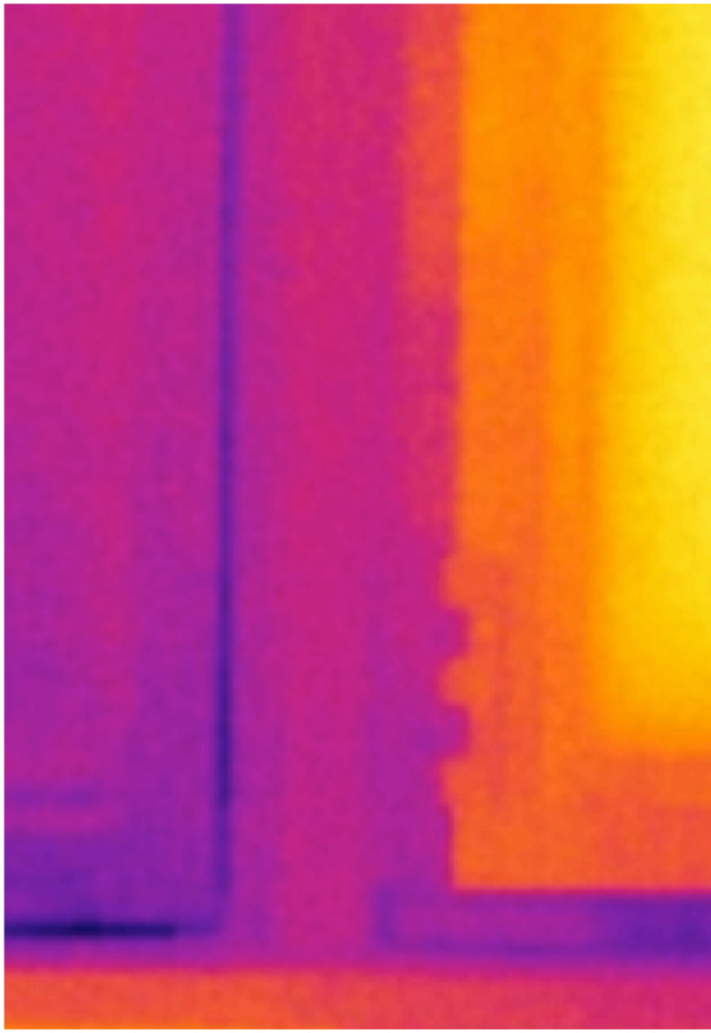
THERMAL BRIDGING IN SHADING DEVICES
A PROOF OF CONCEPT STUDY

NORTH AMERICAN PASSIVE HOUSE CONFERENCE, 2013
PITTSBURGH, PA
SARA TEPFER, UNIVERSITY OF CALIFORNIA, BERKELEY
ALISON KWOK, UNIVERSITY OF OREGON







FORD ALUMNI CENTER

60,000 FT^2
COMPLETED 2011
PURSUING LEED GOLD

LEWIS INTEGRATIVE SCIENCE BUILDING

103,000 FT^2
COMPLETED 2012
PURSUING LEED PLATINUM

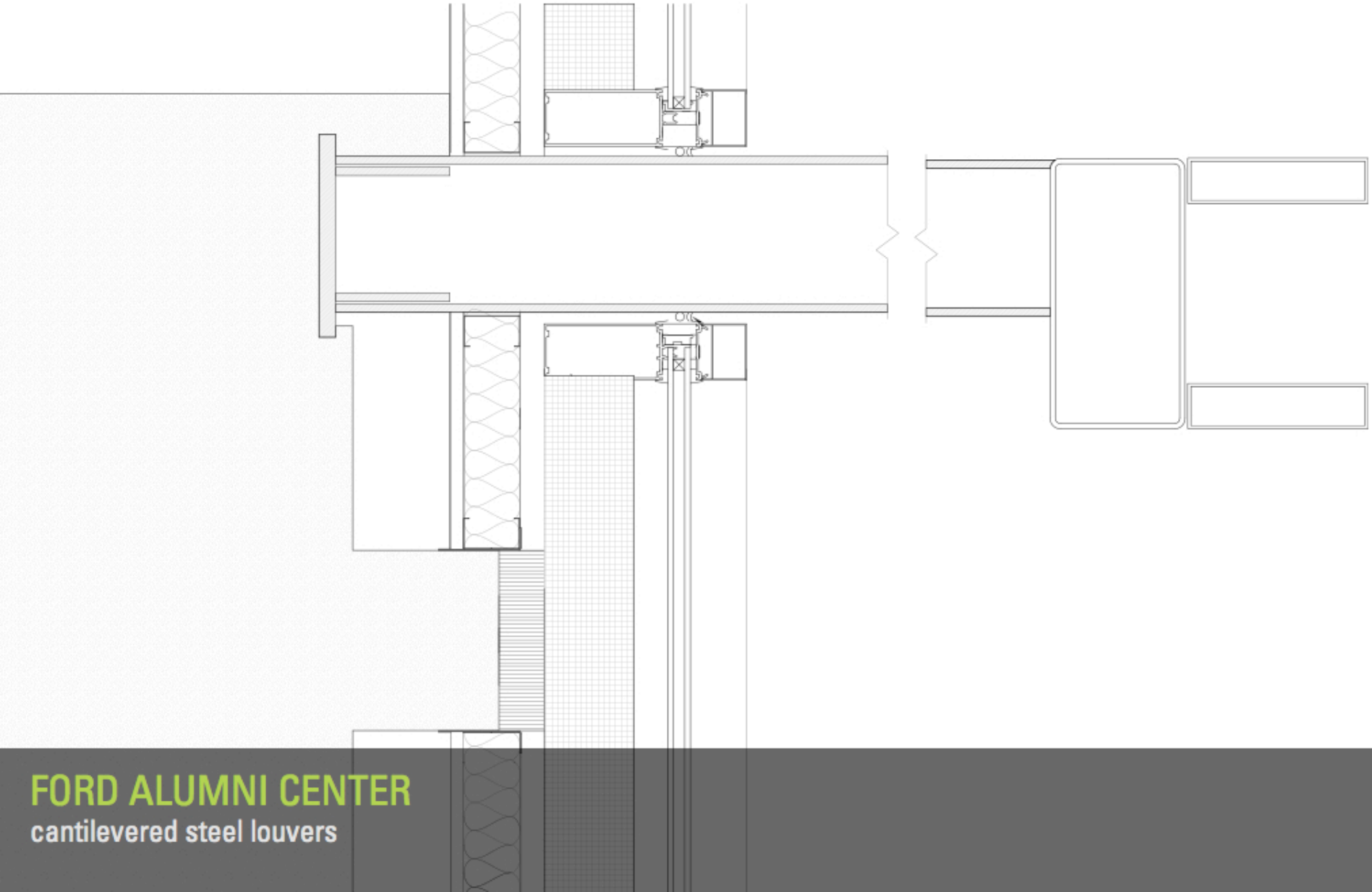
ALLEN HALL

18,000 FT^2
COMPLETED 2012
BUILT TO LEED GOLD EQUIVALENT

FORD ALUMNI CENTER
cantilevered steel louvers

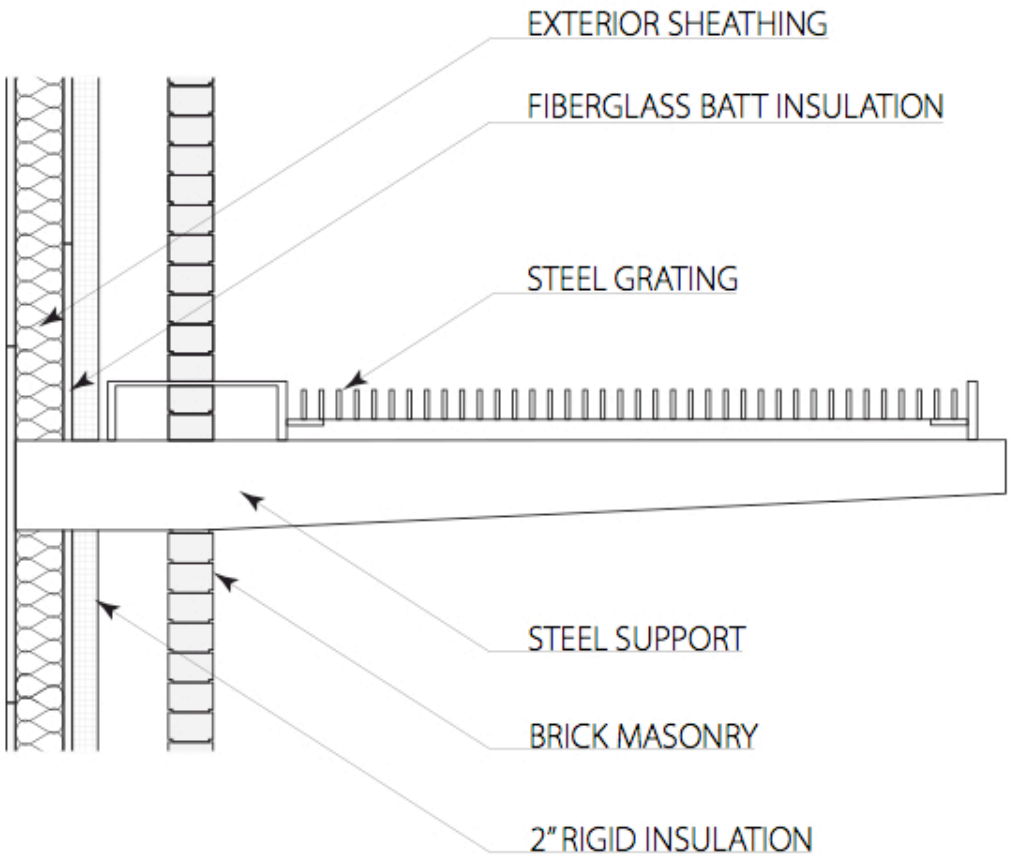
INTEGRATIVE SCIENCE
cantilevered steel frame with steel mesh inset

ALLEN HALL
mullion-attached, perforated aluminum plates



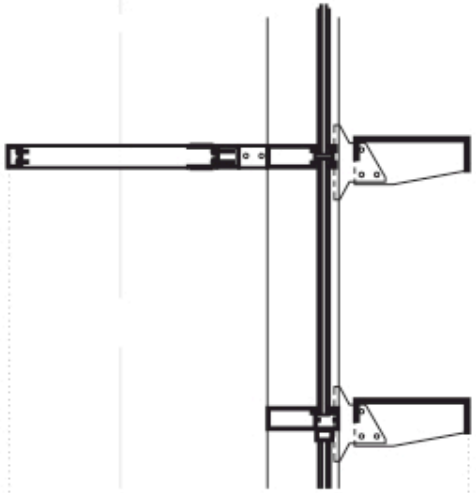
FORD ALUMNI CENTER

cantilevered steel louvers



LEWIS INTEGRATIVE SCIENCE

cantilevered steel frame with
steel mesh inset



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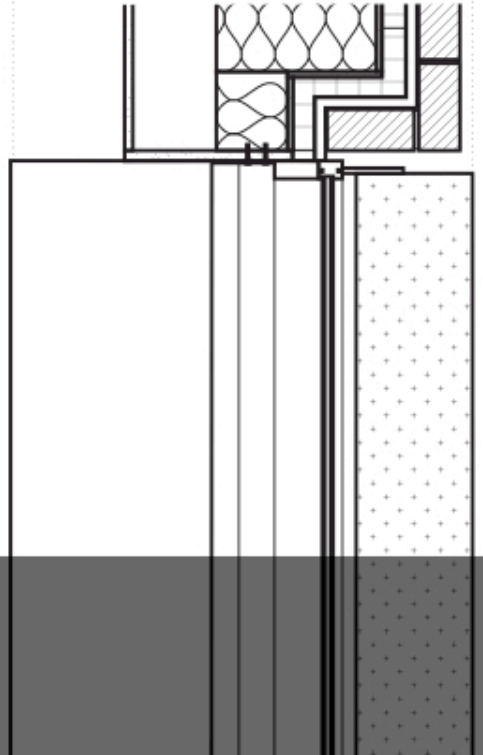


PLAN

ALLEN HALL

mullion-attached, perforated aluminum plates

HYPOTHESIS

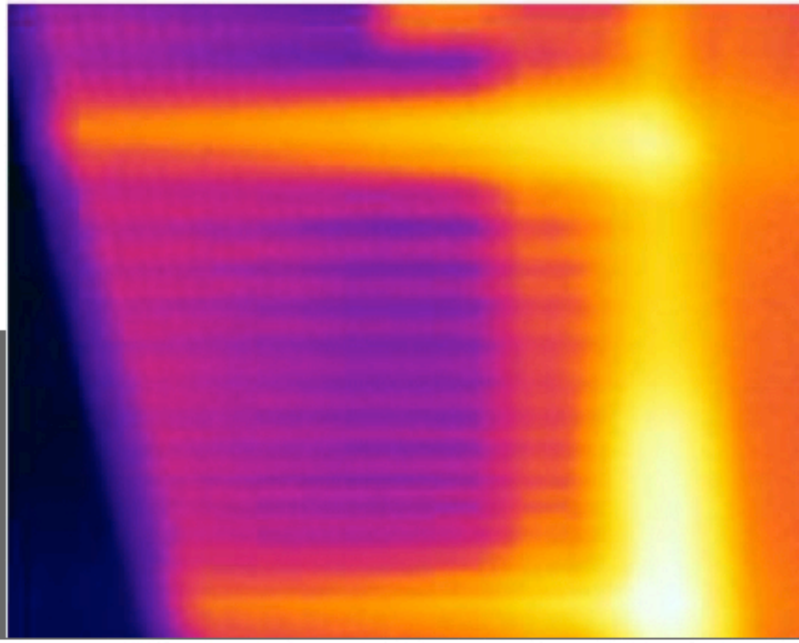
For three institutional buildings in Oregon, the attachment points of south-facing, horizontal metal sunshade systems can have non-trivial effects on the thermal resistances of the walls on which they are mounted.

MEASUREMENT AND VERIFICATION

QUALITATIVE: THERMOGRAPHY
QUANTITATIVE: HEAT FLUX TRANSDUCERS
THEORETICAL: THERM TWO-DIMENSIONAL HEAT FLOW MAPPING

MEASUREMENT AND VERIFICATION

QUALITATIVE: THERMOGRAPHY

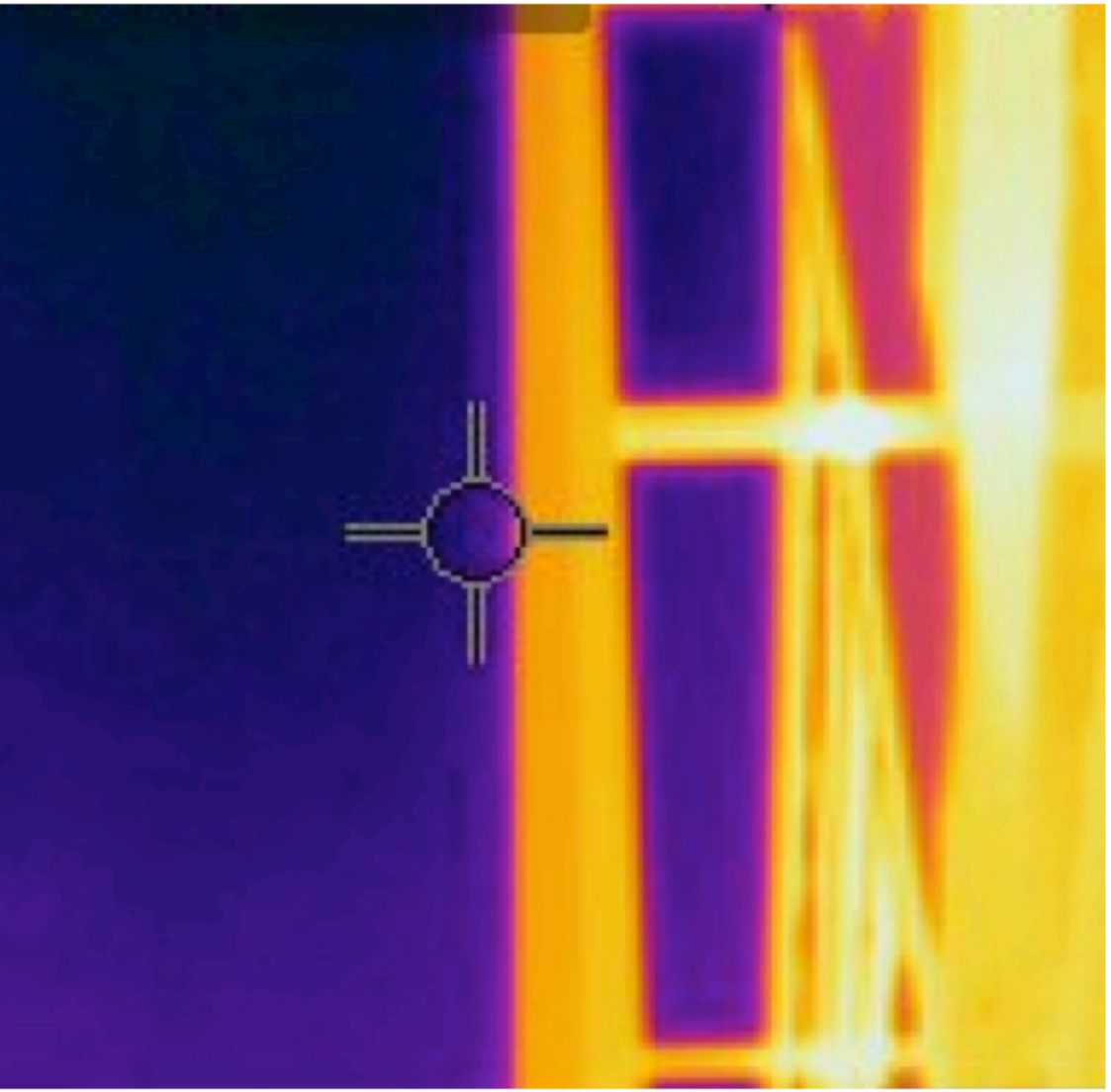


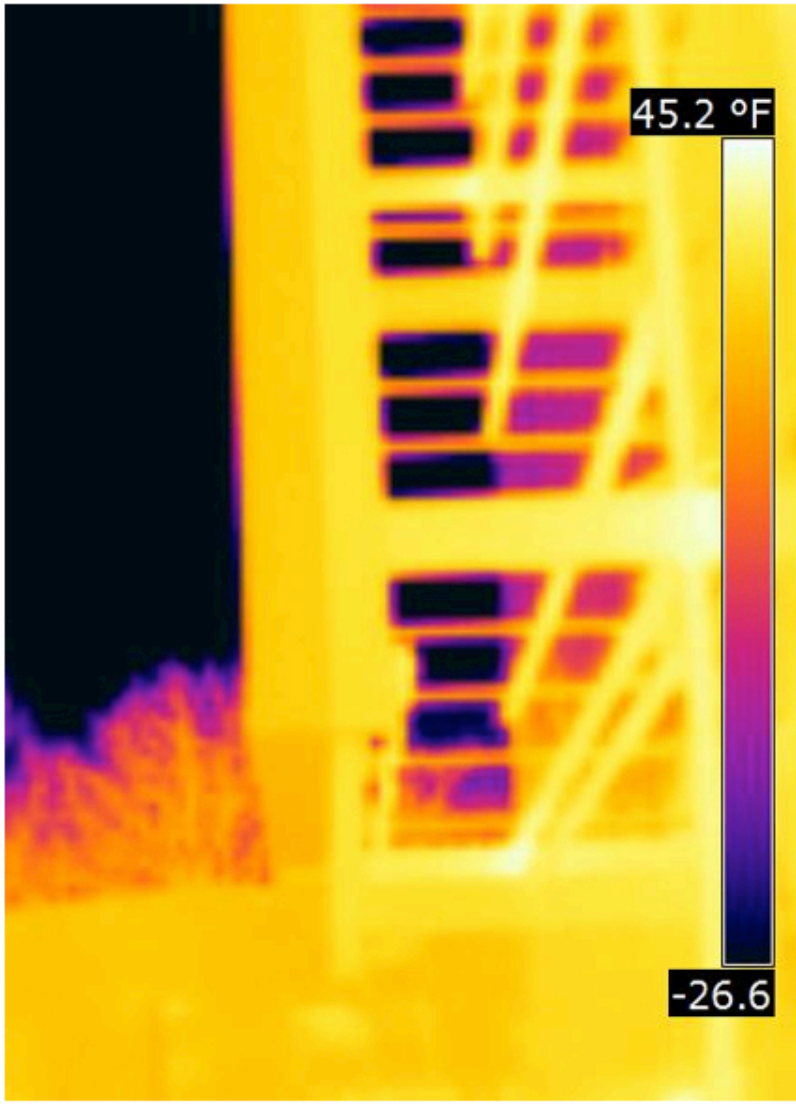
MEASUREMENT AND VERIFICATION

QUANTITATIVE: HEAT FLUX TRANSDUCERS

MEASUREMENT AND VERIFICATION

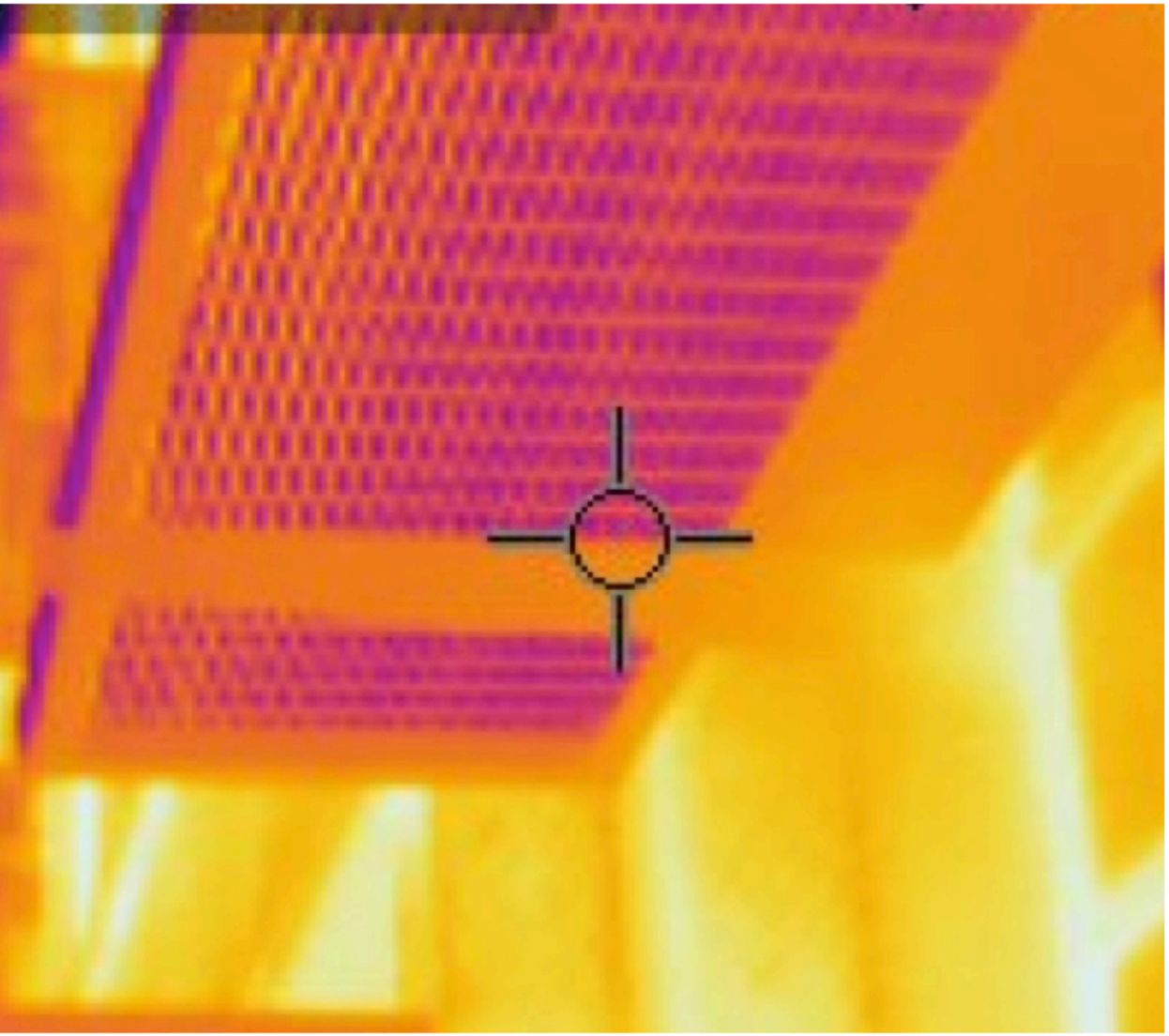
THEORETICAL: THERM TWO-DIMENSIONAL HEAT FLOW MAPPING

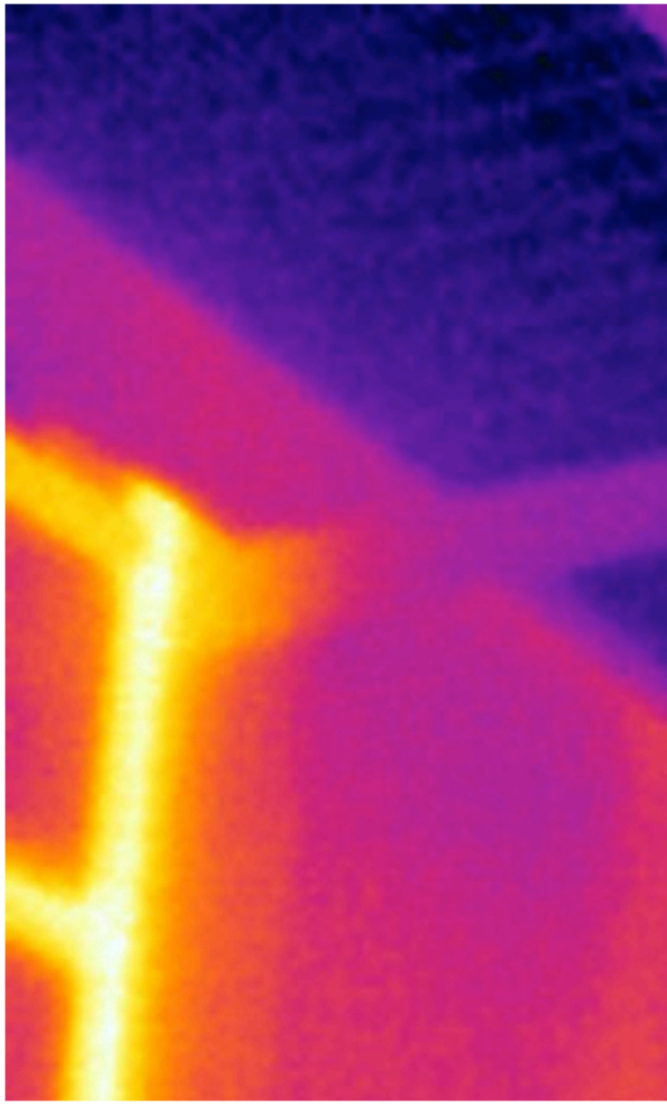




FORD ALUMNI CENTER

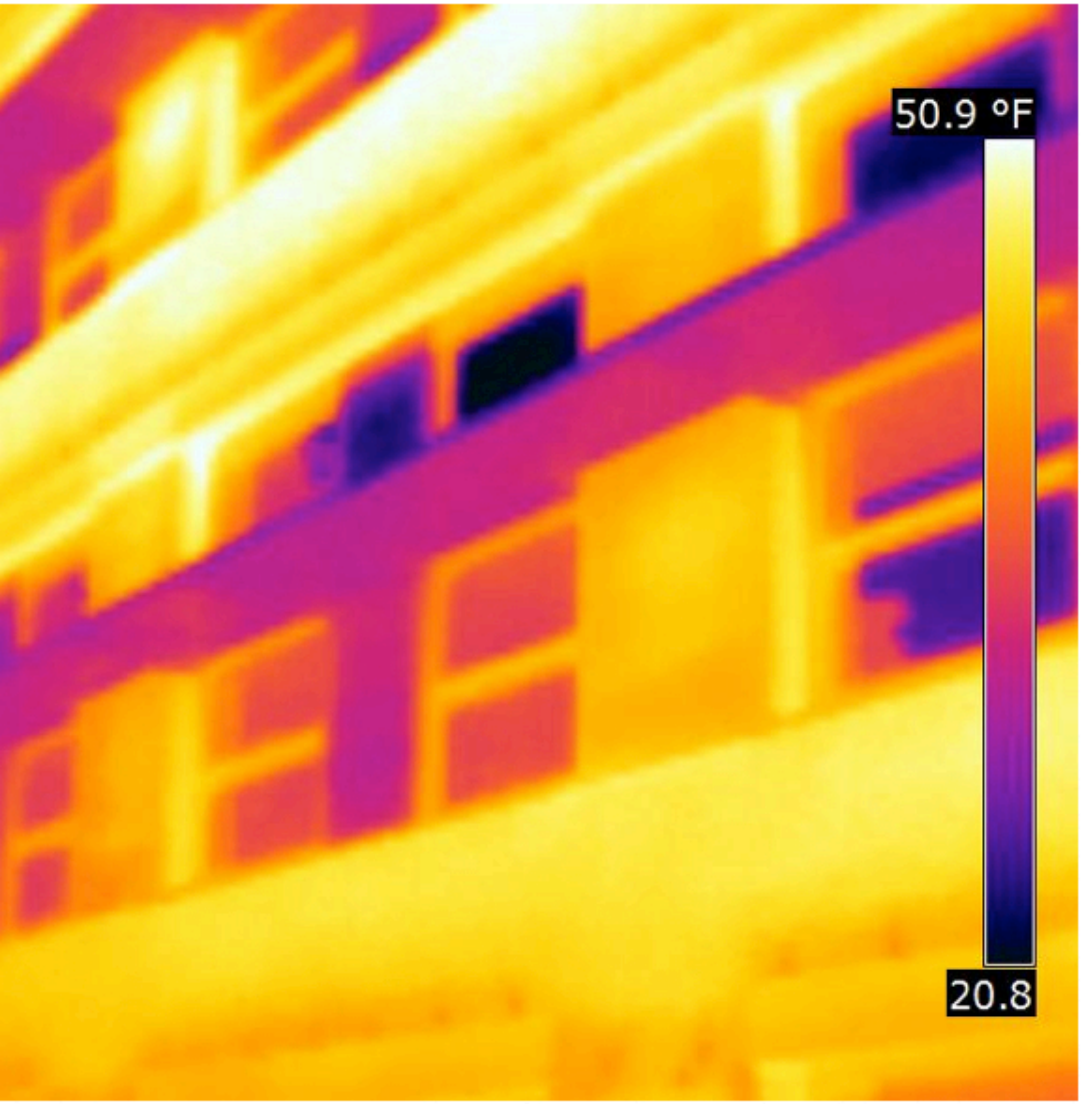
cantilevered steel louvers

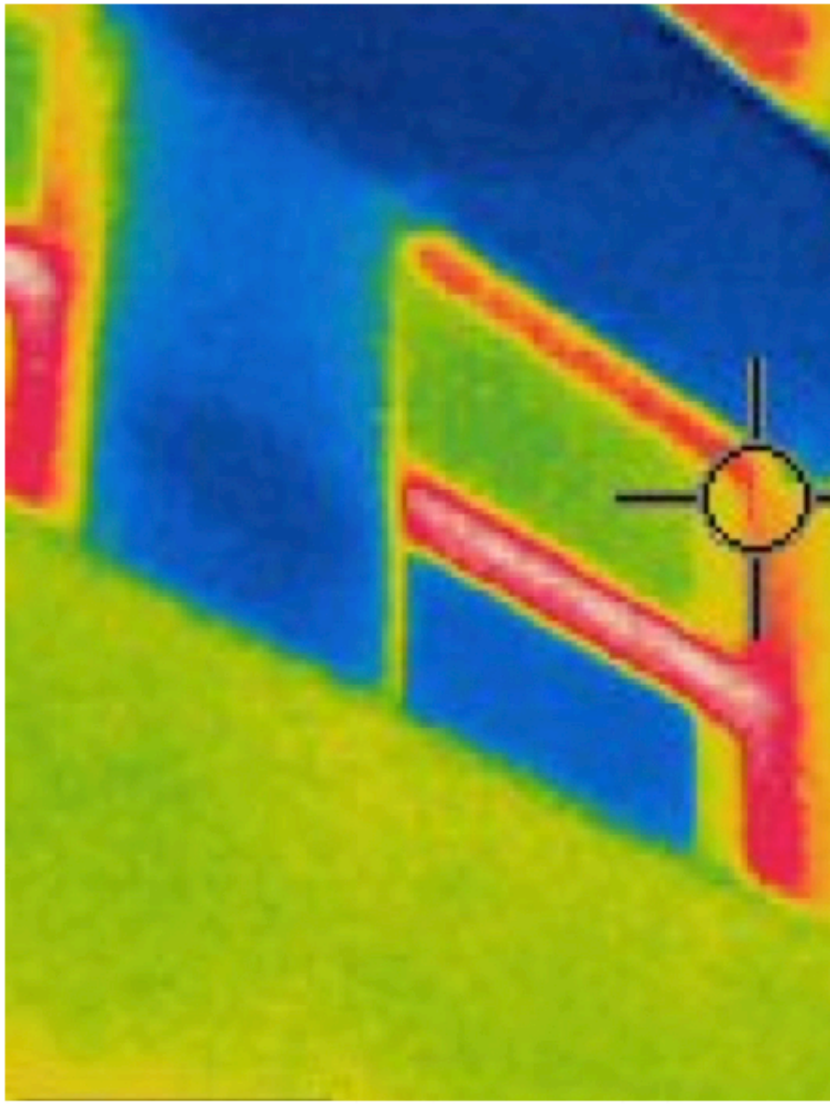




LEWIS INTEGRATIVE SCIENCE

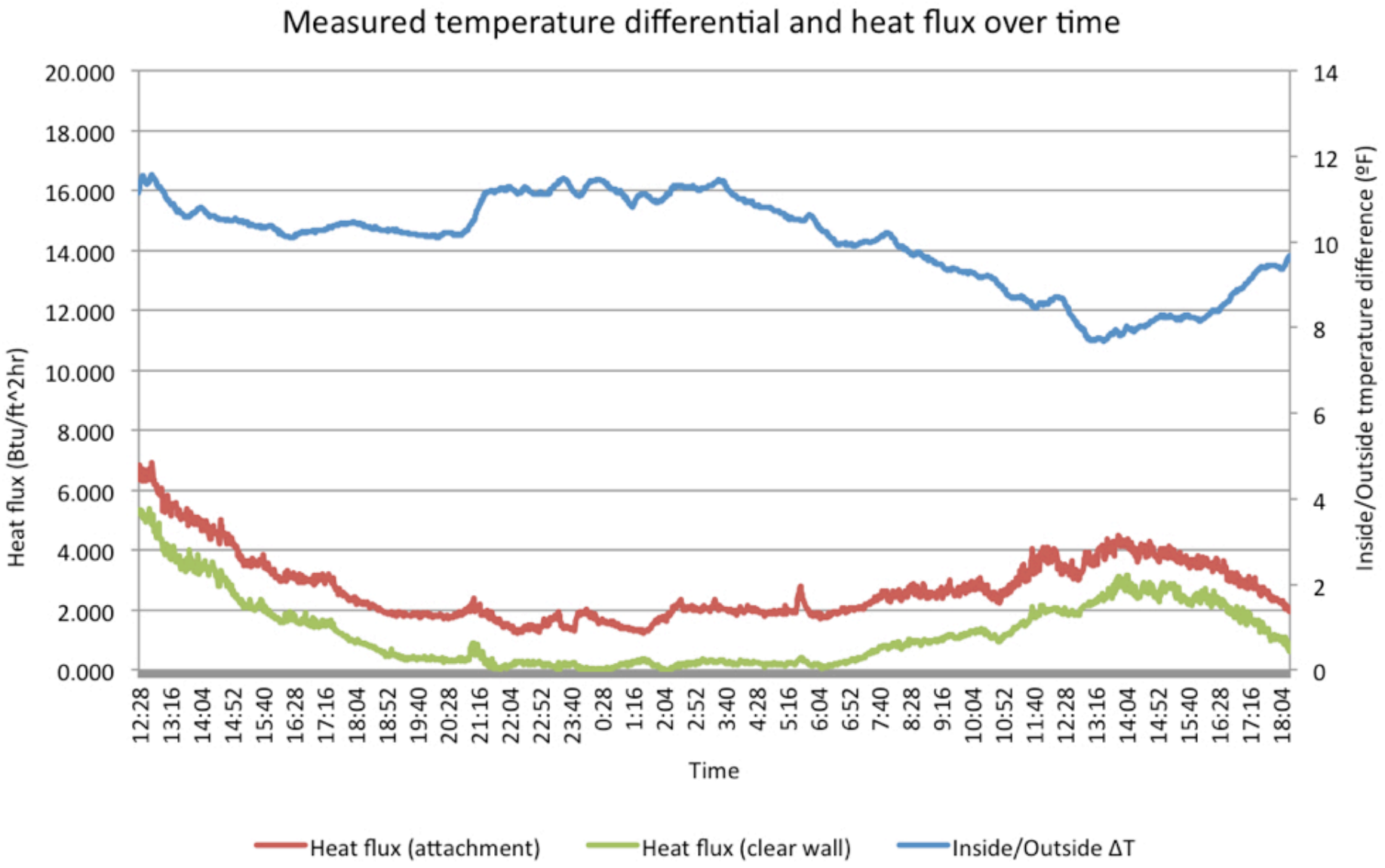
cantilevered steel frame with
steel mesh inset





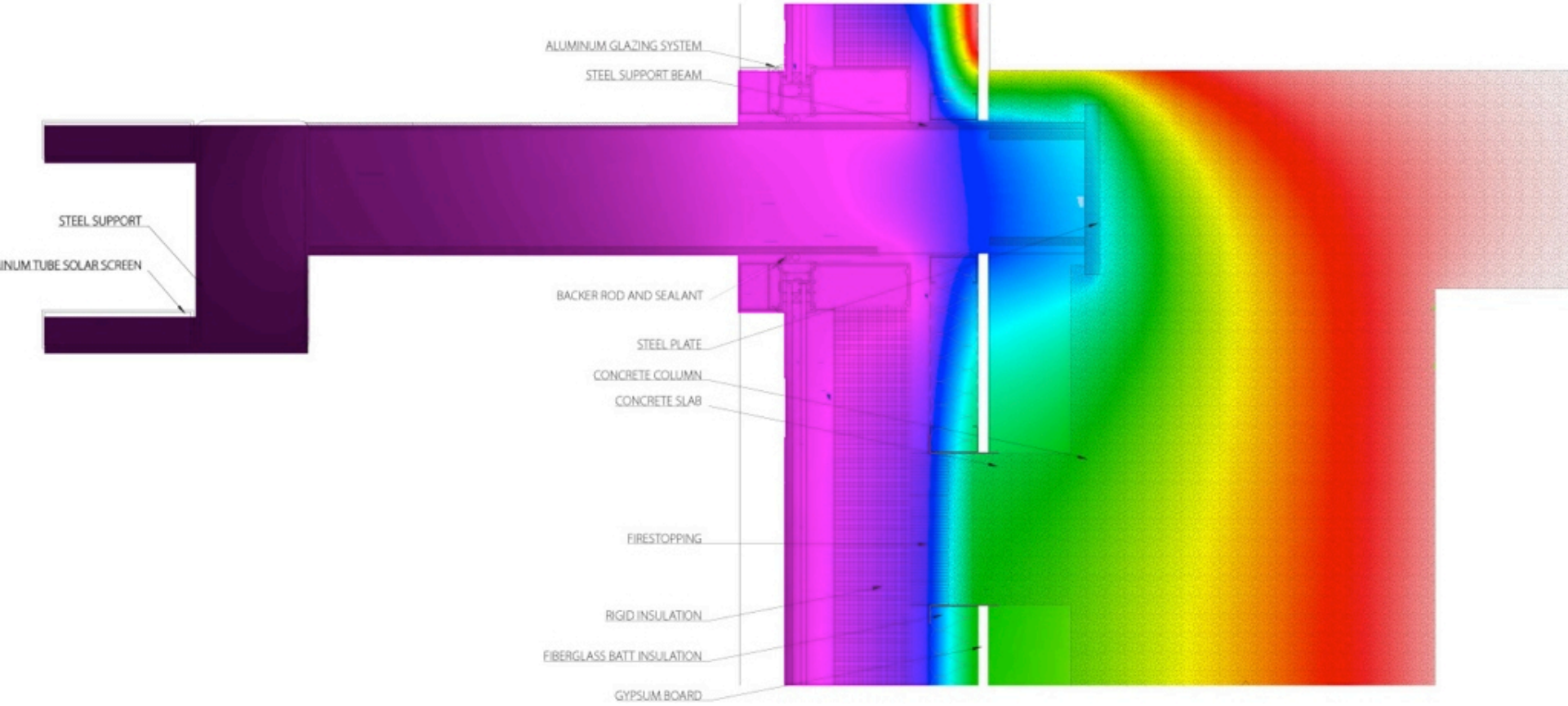
ALLEN HALL

mullion-attached, perforated
aluminum plates



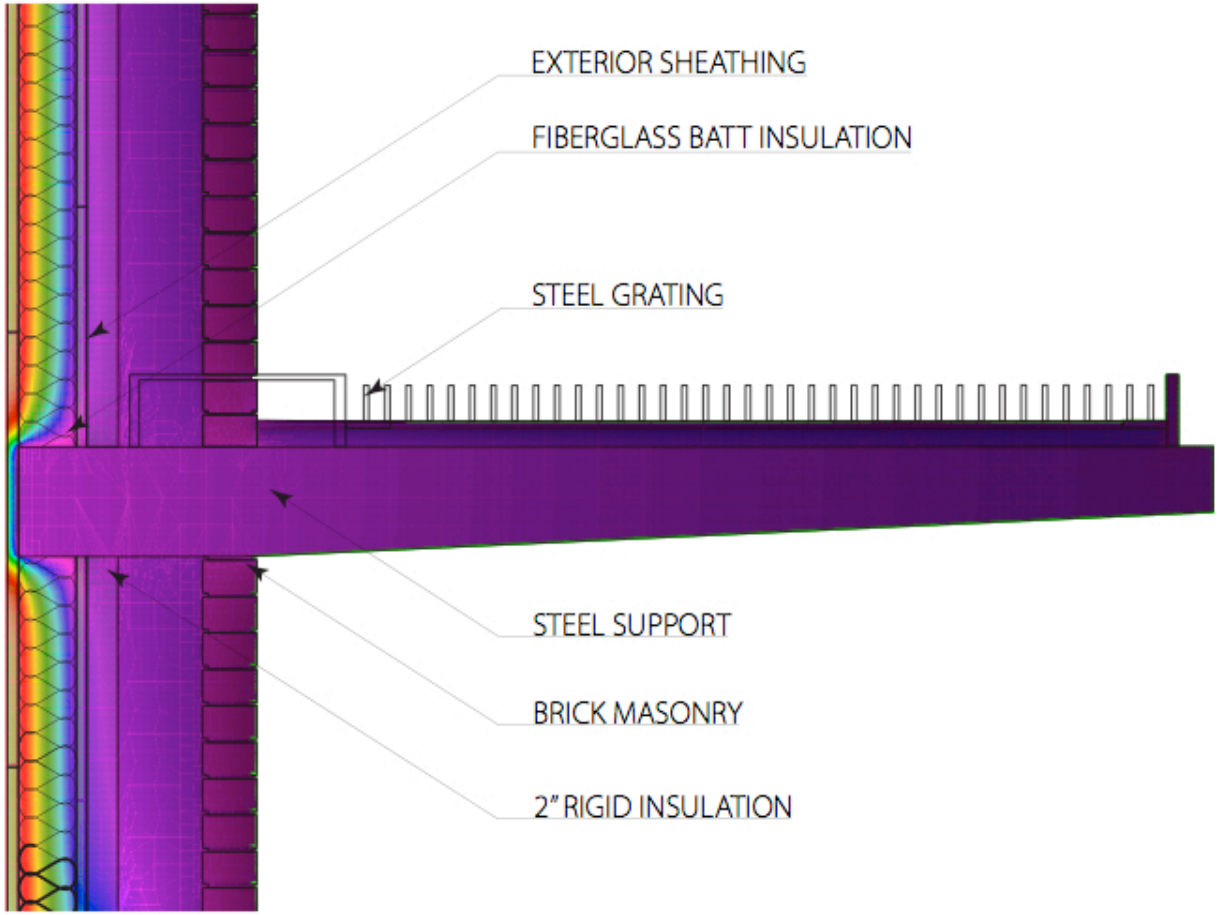
FORD ALUMNI CENTER

cantilevered steel louvers



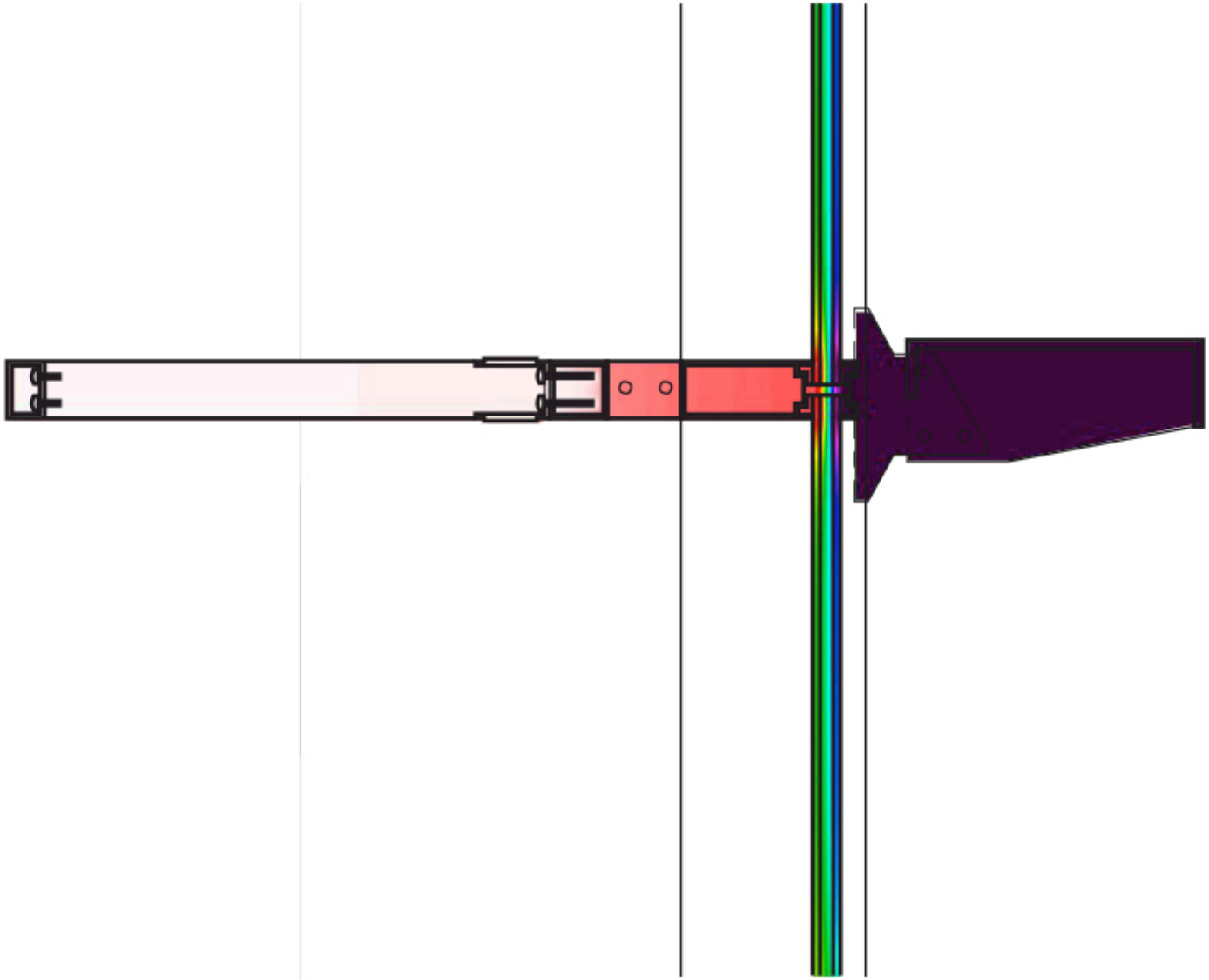
FORD ALUMNI CENTER

cantilevered steel louvers



LEWIS INTEGRATIVE SCIENCE

cantilevered steel frame with
steel mesh inset



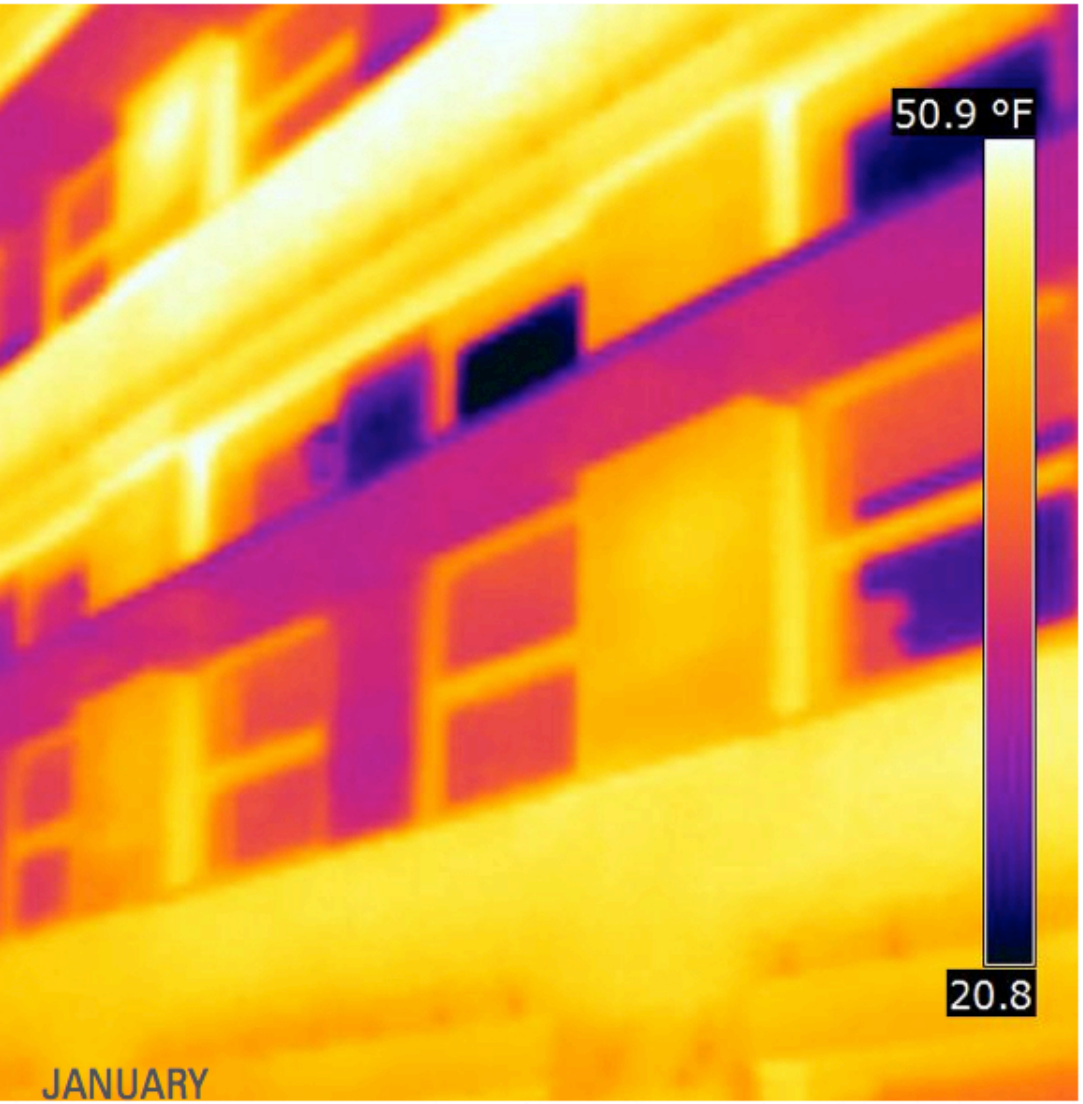
ALLEN HALL

mullion-attached, perforated
aluminum plates

CONCLUSIONS

DETAILS COUNT: ~30% DECREASE IN THERMAL PERFORMANCE

BALANCING ACT: WEIGHING VALUE OF HEATING V. COOLING PERFORMANCE



BALANCING ACT

mullion-attached, perforated aluminum plates

THANK YOU

ALISON KWOK UNIVERSITY OF OREGON, DEPARTMENT OF ARCHITECTURE
JANET SVENSSON UNIVERSITY OF OREGON, CAPITAL CONSTRUCTION
FRED TEPFER UNIVERSITY OF OREGON, CAMPUS PLANNING AND REAL ESTATE
DIANE WILEY UNIVERSITY OF OREGON, CAMPUS PLANNING AND REAL ESTATE