

DISCOVERY

a publication of HED

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VER 2.0

HED

Today's STEM building should be a buzzy hub for science on campus — a diverse facility that supports the convergence of research and teaching. One that is resilient and will adapt to evolving teaching methods and technology to remain relevant and rooted in the campus.

At its core, it exists to promote a sense of belonging in the science community, to amplify learning, to empower faculty and **to inspire discovery.**

HED implements proven design strategies to deliver a finished project that is **rich in key STEM attributes** to positively impact the next generation of elite scientists, engineers, and educators.





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ACTIVITY

The integration of **hands-on learning through constructing, deconstructing and fabricating solutions** to real-world, content-based problems using different tools, technologies and techniques in a shared design studio, prototyping, or innovation hub to promote problem solving and design thinking.



**Maker, hacker,
tinker** culture

Promote
design thinking

Build to think



Clockwise from left to right
(click on a hyperlink to learn more):

[University of Michigan–Flint
Murchie Science Building](#)

[University of Southern California
Irvine and Young Hall](#)

[University of Michigan
Ford Motor Co. Robotics Building](#)



IHED


Clockwise from left to right
(click on a hyperlink to learn more):

[University of Michigan
Ford Motor Co. Robotics Building](#)

[University of Michigan
Ford Motor Co. Robotics Building](#)

[University of Southern California
Irvine and Young Hall](#)



The image features a solid red background. On the left side, there are two large, white, stylized arches that resemble the letter 'R'. The top of each arch is curved, and the bottom is a flat horizontal line. The arches are positioned in the upper half of the frame, with the right one being slightly higher and further to the right than the left one.

"I don't know of any building like this in the world. These state-of-the-art labs are fitted with some of the most advanced scientific instruments. Couple that with the fact that they will bring together researchers and students from across campus and beyond, and it's clear **this will be an unbelievable intellectual environment for the development of next-generation robots.**"

– Eric Michielssen

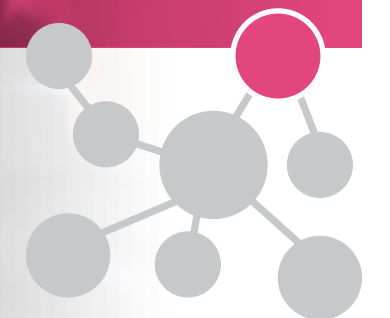
Louise Ganiard Johnson Professor of Engineering and
Associate Vice President for Advanced Research Computing
University of Michigan
Ford Motor Company Robotics Building



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FLEXIBILITY

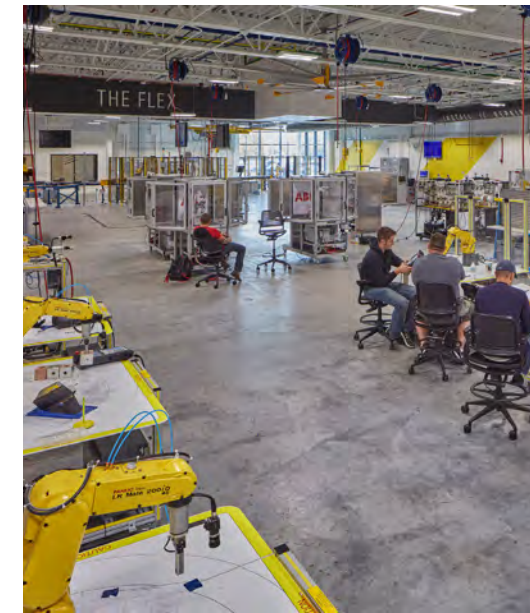
Design buildings smartly for **short-term reconfigurability and future-proofing**. Utilize mobile casework, robust infrastructure, raised flooring, configurable power sources, and moveable partitions. Resilient building planning with smart placement of monuments and utilities to allow the building to evolve.



Short-term
changeability

Long-term
considerations

Resilience



Clockwise from left to right
(click on a hyperlink to learn more):

[University of Southern California
Irvine and Young Hall](#)

[Los Angeles Comm. College District
DaVinci Hall](#)

[Lansing Community College
Center for Manufacturing Excellence](#)



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(click on a hyperlink to learn more):

[Univ. of Illinois Urbana-Champaign
Mechanical Engineering Building](#)

[Univ. of Illinois Urbana-Champaign
Mechanical Engineering Building](#)

[Los Angeles Comm. College District
DaVinci Hall](#)



"I thrive when working closely with all stakeholders in a highly inclusive process to clarify goals and objectives and create a compelling project vision. I believe that the clarity of the resulting mission and vision transcends project challenges and limitations and energizes all those involved with the project. It is exciting collaborating and creating innovative and **inspirational design solutions with a passionate team to transform campuses and positively impact the STEM learning experience.**"

– **Chris Vogelheim** AIA, LEED AP
Principal, Higher Education Sector Leader | Detroit





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ENGAGEMENT

Embrace non-traditional organizational and planning strategies to create **networks beyond roles and departments**. Thoughtful planning will drive relationships between disciplines, connect faculty and students, link research and learning, and create places for team-based exploration and learning.



Team-oriented,
project based
Organize around
themes, not departments
Interdisciplinary



Clockwise from left to right
(click on a hyperlink to learn more):

[University of Southern California
Irvine and Young Hall](#)

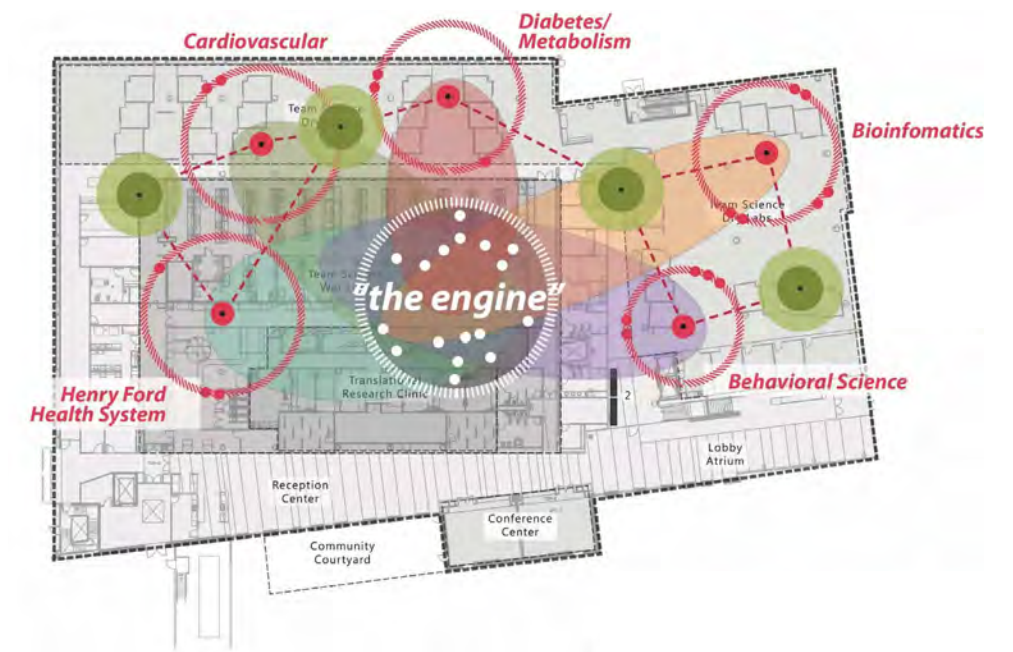
[Texas A&M AgriLife Extension
AgriLifeResearch Center](#)

[Saddleback College
Advanced Technology and Applied
Science \(ATAS\) Building](#)




Clockwise from left to right
(click on a hyperlink to learn more):

- [Flintridge Preparatory School
Bachmann Collaboration Building](#)
- [Univ. of Illinois Urbana-Champaign
Mechanical Engineering Building](#)
- [California State Univ.-Northridge
META+Lab](#)
- [Wayne State University
Integrative Bioscience Center](#)



themes, not departments
[the science of team science.]



“...I’m most excited about the difference in how I see the students use the building. If you walk into the Chemistry Learning Center you will see **students sitting in groups, working on problems together, and teaching each other chemistry!** This didn’t happen as much before, which tells me: the renovation worked.”

– Dr. Christian Ray
Teaching Associate Professor of Chemistry
University of Illinois Urbana-Champaign
Chemistry Annex



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CONNECTIVITY

Make technology simple and effective to allow for unlimited connectivity by all users. Provide **robust infrastructure and careful planning to support the newest fully integrated technologies** to enhance and amplify learning. Plan each space for displays and monitors to activate sharing and promote a team-based culture.



Emerging **audio
visual & virtual reality**
technologies

Universal access to
display & projections

Interactive tech



Clockwise from left to right
(click on a hyperlink to learn more):

[University of Southern California
Wallis Annenberg Hall](#)

[Saddleback College
Advanced Technology and Applied
Science \(ATAS\) Building](#)

[University of California San Francisco
Anatomy Lab](#)



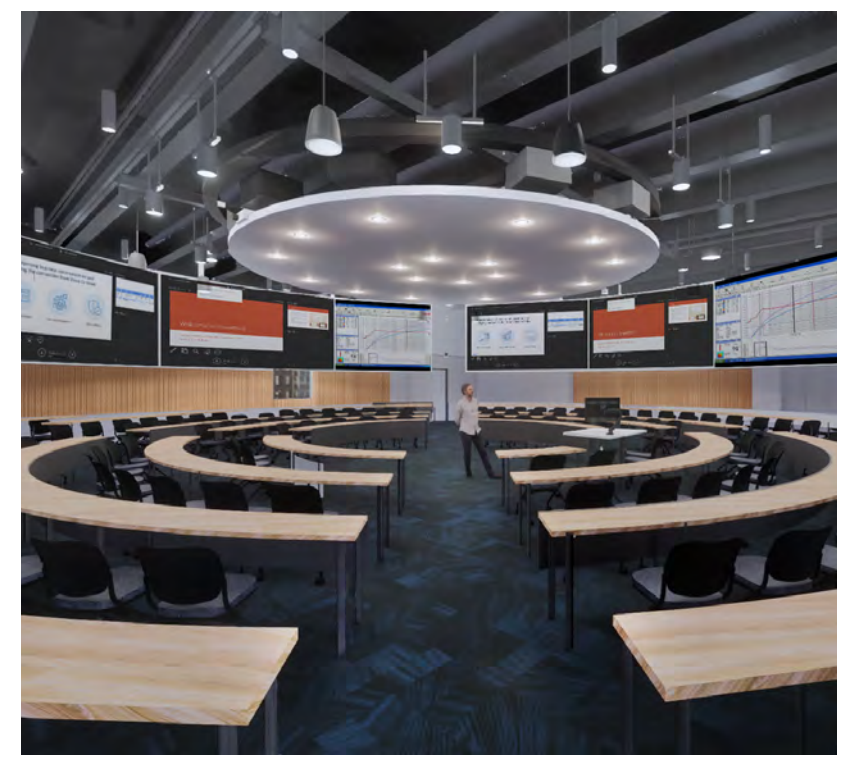
IHED

Clockwise from left to right
(click on a hyperlink to learn more):

[Michigan Technological University
H-STEM Engineering Building](#)

[University of Michigan
Ford Motor Co. Robotics Building](#)

[University of Michigan
Ruthven Building](#)



"Planning laboratories for STEM environments is the work of a lifetime.

Research facilities must be adaptable, flexible, and capable of providing a robust springboard for diverse research, while spaces for learning must relate to science and pedagogy in meaningful and productive ways. We are looking to support engagement while creating an environment that energizes, interconnects, and restores. These are deeply complex environments, simply expressed."

– Marilee Lloyd AIA

Associate, Laboratory Planning Expert | Detroit

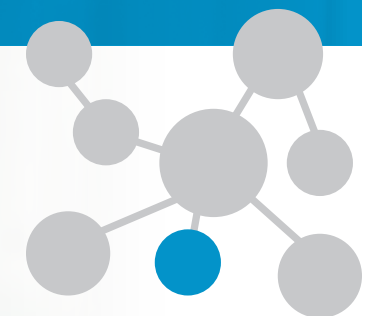




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VISIBILITY

Increased **visibility of research and tinker/hacker activity** creates excitement and inspires a desire to learn and explore. Transparency between labs and support spaces enhances safety and security and creates connections between research teams.



Science **on display**
Visual **connections**
Safety & security



Clockwise from left to right
(click on a hyperlink to learn more):

[University of Michigan
Aaron Friedman Marine
Hydrodynamics Lab](#)

[University of Michigan
Ford Motor Co. Robotics Building](#)

[Cleveland State University
Washkewicz College of Engineering](#)




Clockwise from left to right
(click on a hyperlink to learn more):

[University of Southern California
Irvine and Young Hall](#)

[University of Michigan
Ford Motor Co. Robotics Building](#)

[University of Michigan
Ford Motor Co. Robotics Building](#)





“With guidance from ... HED we ... pursued several forward-looking design features in this expansion including innovative cross-disciplinary and collaborative spaces, putting **science on display and showcasing STEM education as a means to recruit talented students and faculty**, building a sense of community for our largely commuter students, and ensuring space to engage with our broader community.”

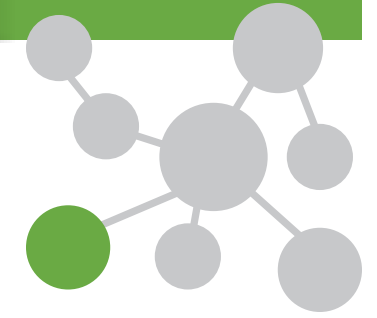
– Susan Gano-Phillips
Dean, College of Arts and Sciences and
Professor of Psychology, College of Arts and Sciences
University of Michigan–Flint
Murchie Science Building



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HEALTHY

Increase **wellness, comfort and productivity by incorporating daylighting and biophilia design.** Encourage activity with well-placed and inviting stairways. Proper lighting temperatures and controllability for increase visual comfort.



Biophilia & **connections to nature**

Access to **daylight**

Open & active pathways

HED



Clockwise from left to right
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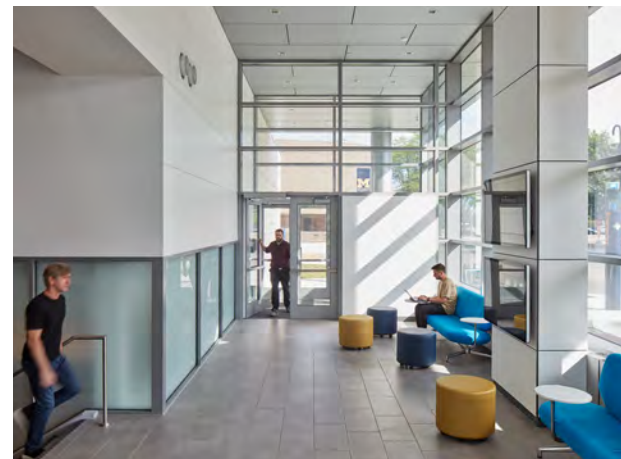
[Cleveland State University
Washkewicz College of Engineering](#)

[Wayne State University
Integrative Bioscience Center](#)

[Wayne State University
Integrative Bioscience Center](#)



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Clockwise from left to right
(click on a hyperlink to learn more):

[University of California–Davis
Latitude Dining Commons](#)

[University of Michigan–Flint
Murchie Science Building](#)

[University of Michigan–Flint
Murchie Science Building](#)

[University of Michigan
Ford Motor Co. Robotics Building](#)



“Success is creating learning and research environments that manifest positive collaboration, connect people, inspire curiosity and **promote a nurturing learning experience.**”

– **Martha L. Ball** FAIA, LEED AP BD+C
Principal, Higher Education Sector Leader | Los Angeles





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COMMUNITY

Design places that **create a STEM community and encourage the use of the building beyond the classroom and laboratories.** Plan for lab support hubs as a place to draw different research teams together. Create a variety of technology-infused spaces to support group collaborations, study, and promote faculty interaction beyond the classroom.



Collaboration beyond
lab & classroom
Buzzy social hub
Promote **interactions**

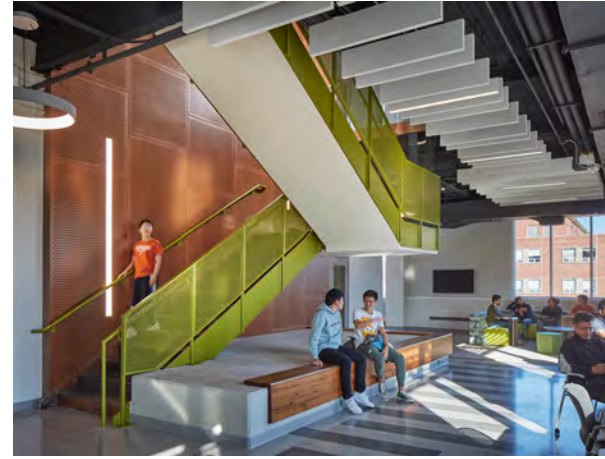


Clockwise from left to right
(click on a hyperlink to learn more):

[Saddleback College
Advanced Technology and Applied
Science \(ATAS\) Building](#)

[University of Michigan–Flint
Murchie Science Building](#)

[Cleveland State University
Washkewicz College of Engineering](#)



Clockwise from left to right
(click on a hyperlink to learn more):


[University of Michigan
Ford Motor Co. Robotics Building](#)

[Univ. of Illinois Urbana-Champaign
Mechanical Engineering Building](#)

[Saddleback College
Advanced Technology and Applied
Science \(ATAS\) Building](#)

[University of Southern California
Wallis Annenberg Hall](#)



The image features a solid red background. On the left side, there are two large, white, stylized arches that resemble the letter 'A'. Each arch is composed of a thick white line that curves from the top left, down to the bottom left, and then back up to the top right. The arches are positioned in the left half of the frame, leaving the right half open for text.

“As you walk through the building, you can see open spaces, glass instead of drywall, communal workstations and a basic flow that has students running into each other all the time, **which will encourage spontaneous conversations and, eventually, spontaneous invention and innovation.**”

– Erica Muhl
Former Dean, Jimmy Iovine and Andre Young Academy
University of Southern California
Iovine and Young Hall



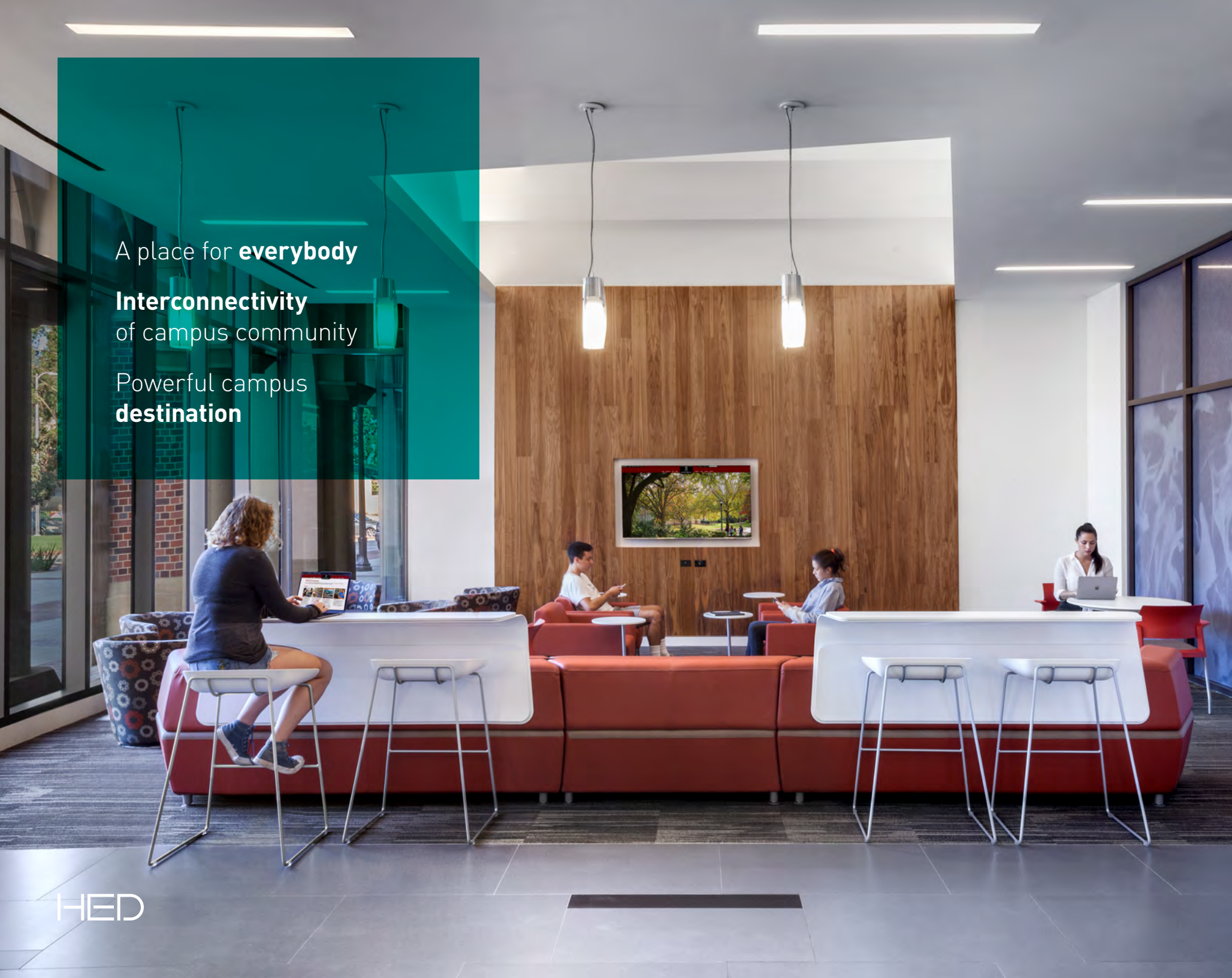
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BELONGING

Powerful and welcoming social hub that attracts everyone. Thoughtful designed space with inclusive and equitable use of materiality, colors, circulation, layout, technology and accommodations to promote a sense of belonging, encourage **sharing of new and diverse perspectives and serve as inspiration** to an inclusive campus and community population.



A place for **everybody**
Interconnectivity
of campus community
Powerful campus
destination



HED



Clockwise from left to right
(click on a hyperlink to learn more):

[University of Southern California
USC Village](#)

[University of Michigan
Ford Motor Co. Robotics Building](#)

[University of Southern California
USC Village](#)



BELONGING 



Clockwise from left to right
(click on a hyperlink to learn more):

[Univ. of Illinois Urbana-Champaign
Mechanical Engineering Building](#)

[University of Michigan
Ford Motor Co. Robotics Building](#)

[Univ. of Illinois Urbana-Champaign
Mechanical Engineering Building](#)

[Los Angeles Trade Technical College
Mariposa Hall](#)



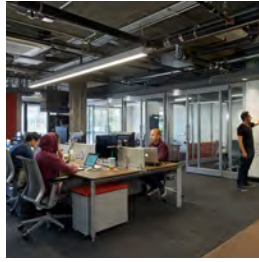
"As an architect, the reason I so enjoy working in the world of STEM is that I believe the environments we give shape and form to have great potential to address **the always present goals of speed-to-innovation and student enrichment**. Spaces designed to inspire, promote spontaneous engagement and connect and build community lay the foundation to allow students, faculty and partners to excel and perform at the highest level."

– **Jack Bullo** AIA, LEED AP
Principal, Design Leader | Detroit



FEATURED PROJECTS

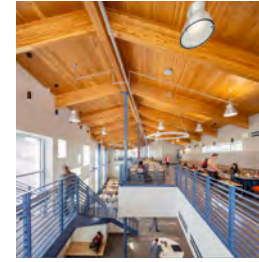
Click on a project image to learn more.



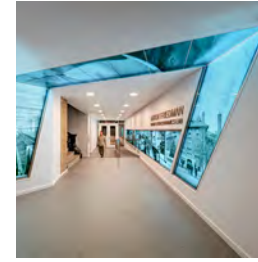
California State University Northridge
META+Lab
Northridge, California



Los Angeles Trade Technical College
Mariposa Hall
Los Angeles, California



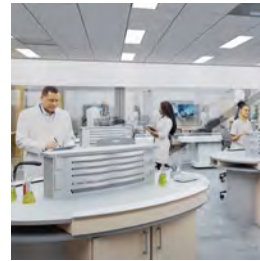
University of California Davis
Latitude Dining Commons
Davis, California



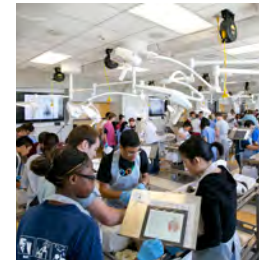
University of Michigan
The Aaron Friedman Marine
Hydrodynamics Lab
Ann Arbor, Michigan



Cleveland State University
Washkewicz College of Engineering
Cleveland, Ohio



Michigan Technological University
H-STEM Engineering Building
Houghton, Michigan



University of California San Francisco
Anatomy Lab
San Francisco, California



University of Michigan
Ford Motor Co. Robotics Building
Ann Arbor, Michigan



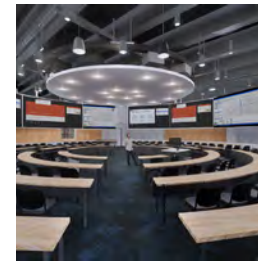
Lansing Community College
Center for Manufacturing Excellence
Lansing, Michigan



Saddleback College
Advanced Technology and
Applied Science (ATAS) Building
Mission Viejo, California



University of Illinois Urbana-Champaign
Chemistry Annex
Urbana, Illinois



University of Michigan
Ruthven Building
Ann Arbor, Michigan



Los Angeles Community College District
DaVinci Hall
Los Angeles, California



Texas A&M University
AgriLife Research Center
Dallas, Texas



University of Illinois Urbana-Champaign
Mechanical Engineering Building
Urbana, Illinois



University of Michigan-Flint
Murchie Science Building
Flint, Michigan

FEATURED PROJECTS CONT'D

Click on a project image to learn more.



University of Pittsburgh at Bradford
Engineering and Information
Technologies Building
Bradford, Pennsylvania



University of Southern California
Lovine and Young Hall
Los Angeles, California



University of Southern California
Wallis Annenberg Hall
Los Angeles, California



Wayne State University
Integrative Bioscience Center
Detroit, Michigan



University of Southern California
USC Village
Los Angeles, California

THANK YOU

We would like to take this opportunity to recognize some of the **colleges and universities we have worked with to positively impact the lives of higher education students** while instilling a sense of discovery toward their future.

Baylor University
California Lutheran University
California State Polytechnic University
California State University System
Campbellsville University
Chabot College
City Colleges of Chicago
Cleveland State University
DePaul University
Eastern Michigan University
Fresno State University
Illinois State University
Joliet Junior College
Kern Community College District
Lansing Community College
Lawrence Technological University
Los Angeles Community College District
Los Angeles Trade Technical College
Michigan State University

Michigan Technological University
MiraCosta Community College District
Miramar College
Northeastern Illinois University
Northwestern University
Oakland Community College
Oakland University
Oakton Community College
Occidental College
Pasadena Area Community College District
Pepperdine University
Point Loma Nazarene University
Rancho Santiago Community College District
Riverside Community College District
Saddleback College
Saginaw Valley State University
San Diego Community College District
San Diego State University
San Jose College

San Jose Evergreen Community College District
South Orange County Community College District
University of California System
University of Cincinnati
University of Detroit Mercy
University of Illinois
University of Iowa
University of Michigan
University of Oregon
University of Pittsburgh
University of San Diego
University of Southern California
University of Tennessee
University of Wisconsin
Ventura County Community College District
Wayne County Community College District
Wayne State University

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