



Da Vinci Center for Innovation
Virginia Commonwealth University

Firm: BCWH

Firm Representative: Charles D. Piper, AIA

Learning Spaces Collaboratory Roundtable
Spring 2016: Focusing on the Future of Planning Learning Spaces
Georgia Institute of Technology

Driving Questions

1. A T-shaped individual is an individual who is anchored in a discipline but has the capacity and openness to span across disciplines. How can learning and the spaces for learning ensure that students become T-shaped individuals upon graduation?
2. Current trends in higher education value a culture of openness and sharing in the academic environment. What can our learning spaces do to promote strategic partnering between students from different backgrounds and disciplines to push learning beyond the boundaries of a classroom?
3. Can architectural identity help champion a program? Can a new space be a catalyst not only for new ideas, but for new programs and curriculum? If you create space, will they come?
4. Can new or renovated architectural space serve as a mechanism to spur innovative learning techniques on a campus? What does a collaboratory look like?
5. Can we grow our potential for learning without growing our campus footprints? Can today's academic needs fit neatly into yesterday's structural bones?
6. How can we structure our buildings on public universities, usually built via capital funds or private donors given to specific programs, as to not silo student thinking? What does a classroom or student environment look like in a topic-based education model?

A cross-pollination of VCU's Schools of the Arts, Business, Engineering, and the College of Humanities and Sciences, the VCU da Vinci Center for Innovation is a unique collegiate model that promotes novelty, entrepreneurship, and a venture creation mindset through interdisciplinary collaboration. When the Center wanted to create a dynamic new environment for its labs and offices, they sought out BCWH to shape an open, transparent, engaging place out of the shell of a historic, turn-of-the-century townhouse. Through a participatory design process, faculty in the Da Vinci Center and architects from BCWH worked to ensure the renovation was responsive and appropriate to students' needs—cultural, emotional, spiritual, and practical.

Before the opening of the da Vinci Center, affectionately known as "807" by the students in reference to its address, the Center was a small certificate program with a few classrooms and a lab in the engineering building and offices in the neighboring business school. The goal of the project was to allow the Center to have a public face and to serve as a 24-hour design incubator. The Center wanted a flexible, open think-tank where students come together in teams to discuss and create, using whiteboards, laptops, hand models, and 3-D machinery to fabricate projects for real-world clients. The designers worked closely with Center faculty to accomplish these goals and set the creative undertone for student work in the space.

In the last two years, the Center has grown into two Masters Programs, three undergraduate certificates, and a scholars program. Enrollment has more than tripled. The product is an example of a renovated space that serves as a catalyst to spur innovation on campus.

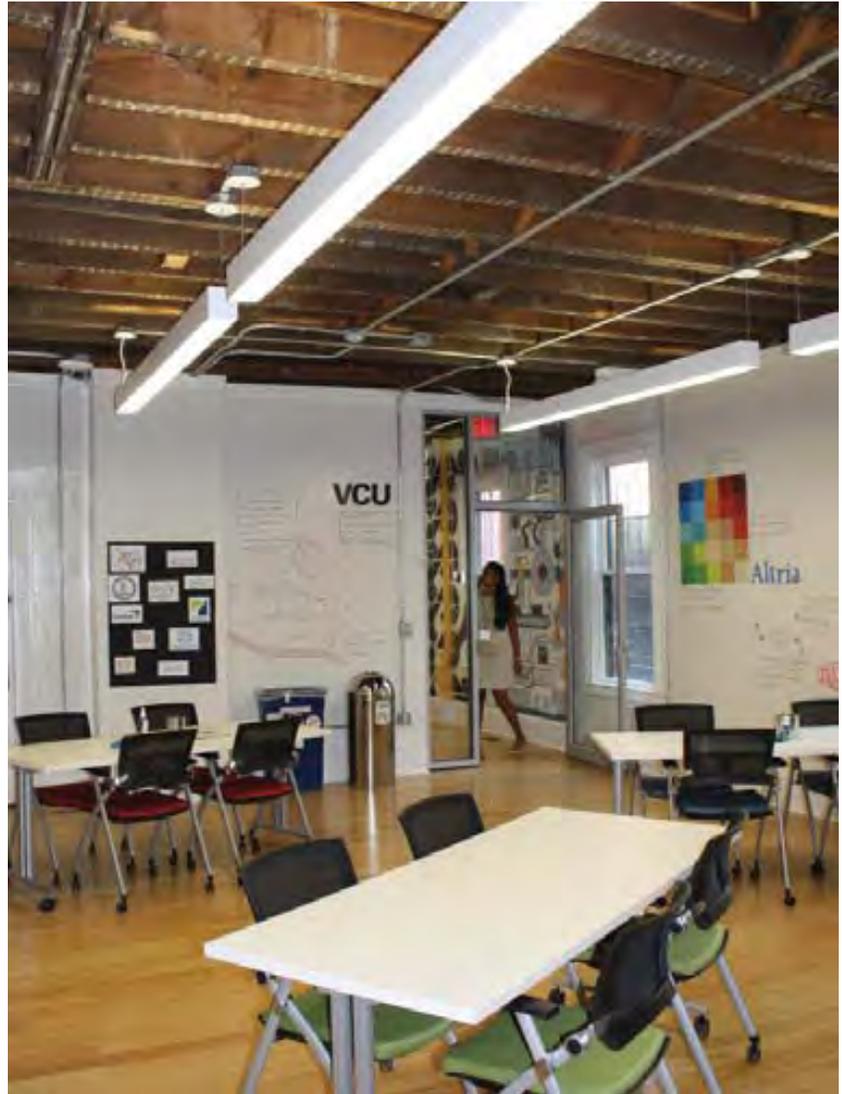
The end result was not only the addition of 3,800 square feet for the program, but a tale of process innovation: the new space has grown and influenced the curriculum of the program, allowed for strategic partnering between students from different disciplines, and grown the potential for learning on campus without actually growing the campus footprint. The building itself has become an "intrapreneur" for the students in the various programs by encouraging risk taking and innovative thinking among its occupants.



Interior Space Pre-Renovation:



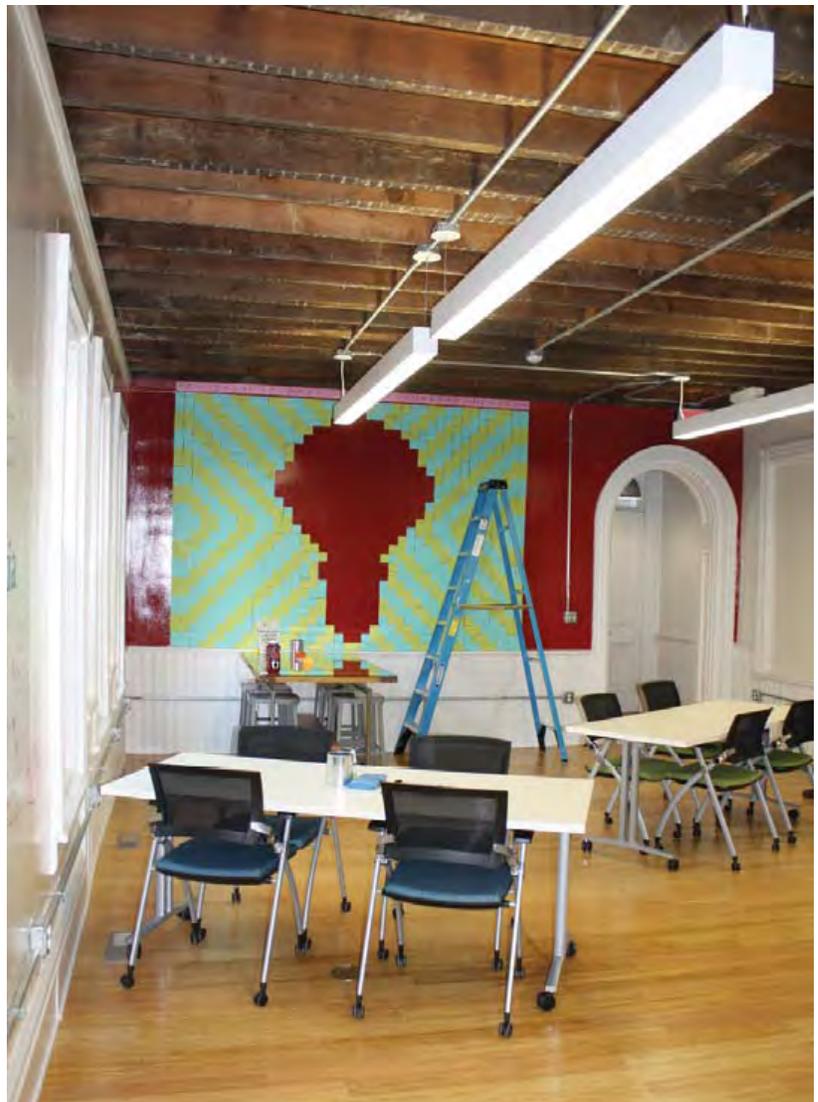
Interior Space of Collaboratory Post-Renovation:



Interior Space Pre-Renovation:



Interior Space of Collaboratory Post-Renovation:



Former Da Vinci Classroom:



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1. Can a facility advance academic science programs forward 50 years in quality, including the incorporation of emerging and future technologies, laboratory flexibility and adaptability, modern learning methodologies and skills, and sustainable energy/building management systems?
2. How does climate impact design with respect to issues of connectivity and separation?
3. Can the limitation of building “footprint” be an asset when designing a facility that requires more program than available site can accommodate?
4. Does “art” integrated within the architecture enhance student learning and discovery?
5. How do students understand how to use the spaces provided?
6. What are the upper limitations/ thresholds for the number of students moving through and engaging with the faculty and within the facility during the course of a typical day?

The Centennial Centre for Interdisciplinary Science (CCIS) at the University of Alberta is a multi-functional, interdisciplinary science center, constructed as a single facility of nearly 600,000 GSF, in the heart of the historic quadrangle on the campus. With this monumental effort and investment, the Alberta Province intends to transform the institution through a scale of investment, research capability, and scientific community energized by the vitality of an undergraduate population. The facility engages a unique population of undergraduate and graduate level functions, spaces, and scale—thousands of students, researchers and faculty interact in the Centre on a daily basis. The CCIS enhances and connects the learning process through visual, personal and experiential connections with science.

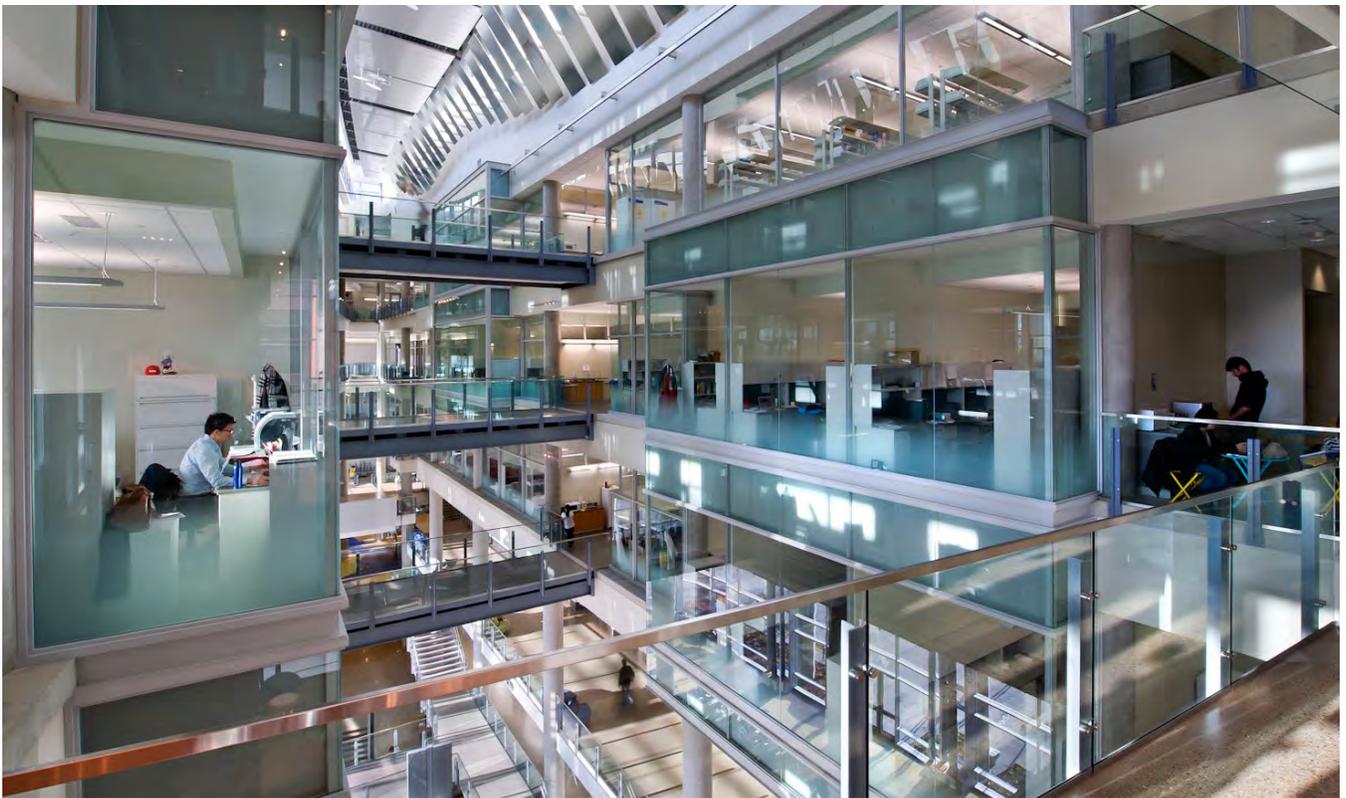
The context of community is central to this academic environment that combines diverse thinking, visual contact, improved opportunities for interactions and the cultivation of ideas—ultimately, intended to increase the pace of research and discovery. Complicated by the lack of available footprint for the facility, the planning process required a solution that respects the scale and identity of the original campus buildings, the public role of the facility on the Main Quad, and the need to engage the public in university functions and activities.

The planning process was defined by a desire to innovate and reimagine the future of science learning on campus. The University President defined this as the desire to look for where the next scientific discoveries would come from, with the aim to build scientific infrastructure that rivals the best in the world. The strategy includes the assembly of diverse scientists with common interests to address complex problems of global importance. The expectation is that cross-disciplinary arrangements of significant scale will increase the effectiveness of science through better integration of University resources, the development of innovative skills, and the attraction of critical talent.





Anchors Main Quadrangle

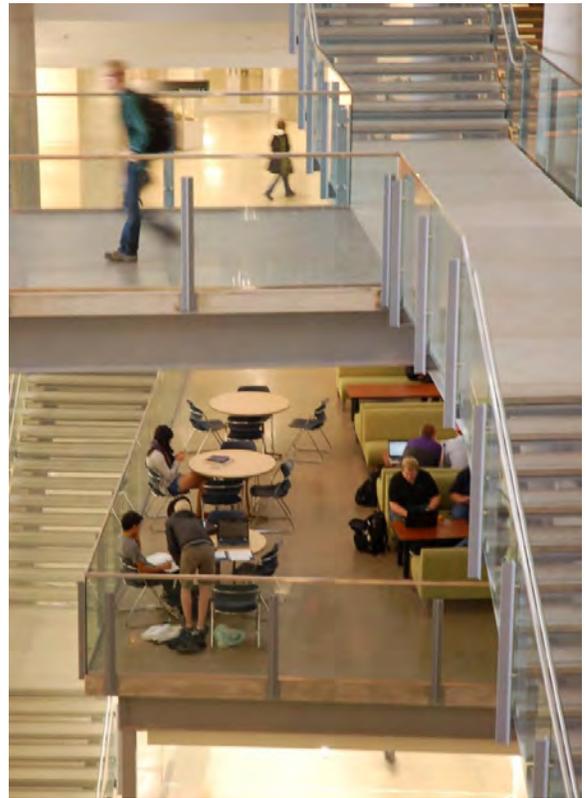


Maximize daylight + transparency

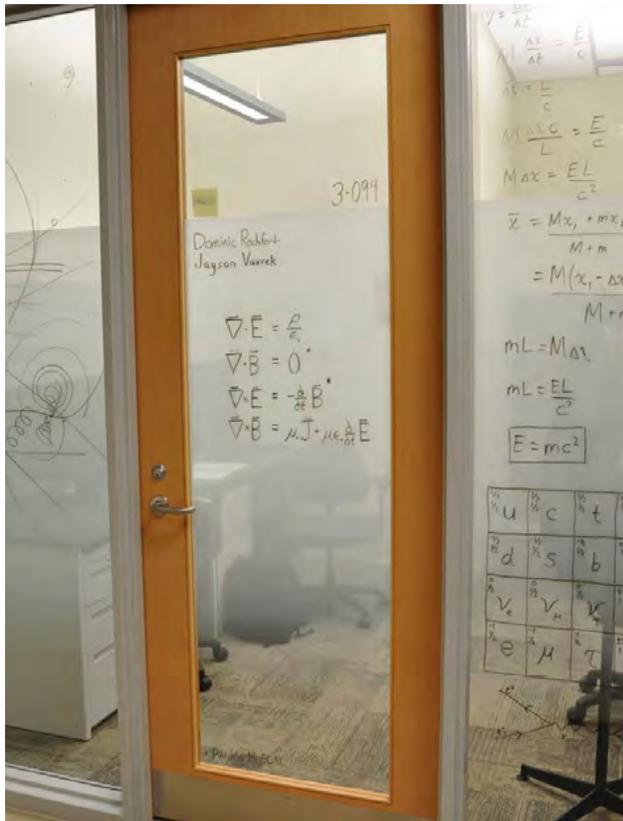




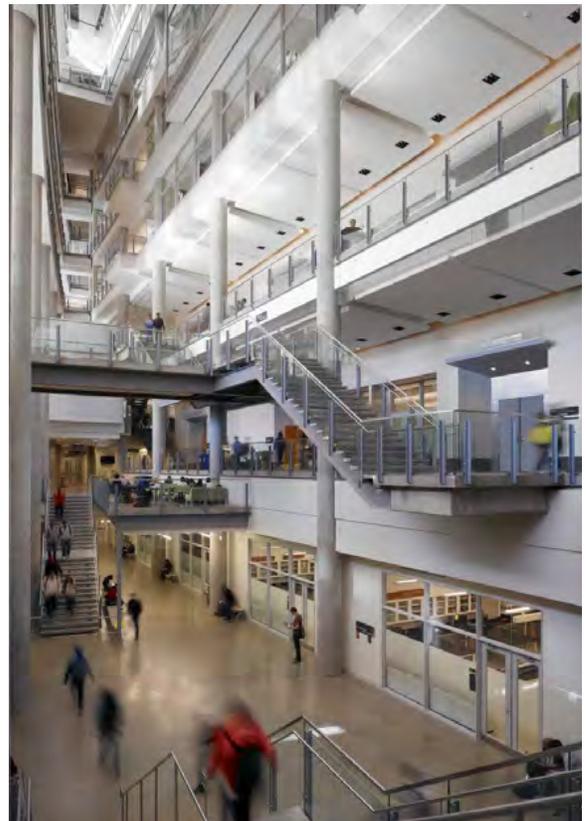
Campus pathways + public art



Student study balconies



Working areas adjacent to faculty offices



Daylight and social centers





New Core Sciences Facility
Memorial University of Newfoundland
Firm: HOK
Firm Representative: Randy Kray, AIA

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Driving Questions

1. What are the opportunities and challenges of integrating sciences and engineering into a core interdisciplinary STEM facility?
2. How can governance and facility design leverage advanced research tools to enhance student learning and research?
3. How can a facility respond to the unique curriculum and pedagogic needs of the lower division (early years) learners?
4. How does a facility encourage and foster the undergraduate research experience?
5. How does an institution build a pathway from departmental to interdisciplinary learning and research models?
6. How can a facility engage with the broader community whether actively participating or passively experiencing the place?

The New Core Sciences Facility is a catalyst in Memorial University's drive to double their faculty and student enrollment in Applied Science and Engineering by 2020. This goal would add 50 new positions to their Faculty of Engineering and Applied Science, more than 300 graduate students and up to 500 additional undergraduates, so they are in need of facilities to accommodate this growth, as well as enable the recruitment/retention of world class faculty and top students.

Providing interdisciplinary learning and research space for Faculties of Science and Engineering, the 450,000 sq. ft. building, which takes design cues from natural elements and local building traditions, is positioned on a signature site that creates a new gateway into the campus.

Flexible lab neighborhoods integrated with the pathways and amenities that serve multiple populations will mix disciplines in an openly transparent research and learning environment that invites students at every stage and background to participate in scientific research and discovery. Science and Engineering will be put on display inside and outside of the building.

The art of science and engineering is demonstrated through socially turbocharged design, used as a creative driver to achieve "the place of choice" for learning and research. Level two is an activated main street/connector; with pedestrian bridges tying into the campus student center and partnering MUN faculties. It is a truly student-focused floor, housing the Senior and Junior design studios, Computer Lab and Classroom, and student collaboration areas.

Active-learning settings utilize flexible furniture and flat panel screens for small group work. Electrical/computer studios include electrical benches with utilities and pod workstations for groups; with table/chairs for teams to cluster and ideate.



The building's design deeply integrates research with learning. The building supports research and teaching labs for Electrical and Computer Science programs, as well as renewable energy teaching and research labs that will be placed on the roof, overlooking solar panels and wind turbines that serve as test beds for applied research. The teaching lab and research labs are colocated so undergraduates can assist with graduate research and participate in more hands-on learning opportunities. The building will also house a student projects lab and optics research lab.

Building upon Memorial's position that the very best comes from bringing diverse programs and people together; the new facility includes 125,000 sq. ft. designated as incubator/industry partner collaborative research space. Enabling external collaborations and commercialization, this space is infused throughout different zones in the new building. Further, growing the Core Research Equipment & Instrument Training Network program (CREAIT) at MUN is a key objective as well. These cores are strategically located at the building's front door with accessibility/transparency where appropriate to celebrate research.



View through atrium showing high visibility into labs and robust student study spaces



Building atrium is illuminated to highlight whale skeleton and put science on display





Building Section through Whale Atrium



Student commons and informal gathering/study space connected by active stair



Lower-Division Learning Environment



Upper-Division Research and Teaching



Learning Space for the Ethnically Diverse Undergraduate Classroom
Morgan State University Center for the Built Environment & Infrastructure Studies

Firm: Hord Coplan Macht

Firm Representative: Jim Determan, FAIA

hord | coplan | macht



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Driving Questions

1. Will greater ethnic diversity in the American classroom impact learning and the design of learning space?
2. If the success of active learning classrooms is attributed to peer-to-peer learning what happens when we change the peers?
3. What are the unique inhibitions of students in a diverse class and how can design of the space mitigate these to enhance learning?
4. Do cultural biases of the investigators impact study outcomes?
5. What is the appropriate team for this inquiry?
6. What are most effective assessment techniques?

We recognize two national trends in higher education—increasing ethnic diversity and the steady growth of active learning classrooms. A team of planners at Hord Coplan Macht and Morgan State University wondered if the success of active learning classrooms is premised on peer-to-peer learning, what happens when the peers change.

A collaborative, professionally and ethnically diverse research team was assembled, including the Dean of the School of Architecture & Planning (Filipino female), Neuroscientist (German female), Instructor (Black male), Science Education Instructor (White female) and architect (White male). This team provided in depth qualitative and quantitative assessment and kept ethnic bias in check.

Our chief findings include increased student-to-student interactions and decreased student-to-instructor interactions in the active learning classroom when compared to the traditional classroom. Student perceptions of the physical space were more positive and they felt more innovative in the active learning classroom. The instructor found students demonstrated more competency in the 4 C's—communication, collaboration, creativity and critical thinking—and overall grades were far superior in the active learning classroom.

Further, the team found that an ethnically diverse class brings unique inhibitions, among them language, culture and a vast variance of preparedness. The students' social behavior, their own perceptions and cognitive measures all indicate the physical design of active learning classroom contributes to mitigating their inhibitions, promoting engagement, and producing enhanced learning outcomes.

Spaces throughout the building promote students thinking and doing within a social context.



Student Testimonials



"I wouldn't dare to lift my hand to answer a question. I think it is because of my language. It is not my native language. But when you have to interact and when you have to talk about it and when have to really make yourself part of something... then you learn."



"In a really formal environment you don't want people laughing at wrong answer; and you don't want to get wrong answer as well. But when there's like a normal conversation... if it's wrong it's wrong; I can learn from them."



"Maybe in general professors speak as if I am already a professional and I am going to understand his perspective. And that's not where the students are going to understand from. I think in a lot of classes you learn more from students than you do from teachers sometimes"



ACTIVE LEARNING CLASSROOM

Students are comfortable to test ideas with their group before presenting to the whole class.



ROUND GROUP TABLES

Students perceive the instructor as a co-learner. Space design defines the instructor's role.



STUDIO

Self-directed learning in collaborative setting.



INFORMAL LEARNING SPACE

Spaces in between for group collaboration.





BREAKOUT ROOMS / GROUP STUDY
Space for intense, extended, discipline-grounded interactions.



MAKER LAB
Space for prototyping, testing and redesign.



TESTING LAB
Space for thinking, building, testing and rethinking.



Driving Questions

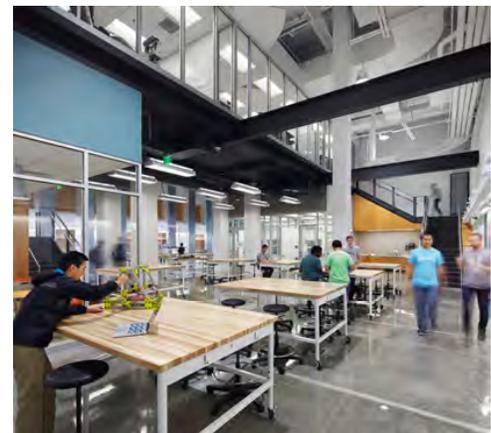
1. How can a small portion of an unloved, sputnik era chemistry building slated for demolition be repurposed in the shortterm to create an economical, “pop-up” collaboration environment?
2. After the initial renovation, the University became excited about the potential of a comprehensive, phased renovation and asked “If we use this for prototyping collaborative space and demonstrating our commitment to sustainability, what groups/ departments have unmet needs for interdisciplinary innovation and how can we create a unique environment for teaching & research?”
3. Throughout the multiple phases we asked: “What is a good mix of functions, spaces, furniture and technology that allows students to find optimum accommodations for individual and group learning?”
4. When the final phase was conceived as flexible maker space, various stakeholders asked “what are the key components of a home that encourages informal investigation and tinkering?”
5. Now that the project is fully occupied, Lord Aeck Sargent believes a post occupancy evaluation should assess the successes and opportunities for improvement with one key overriding question being: “How do we best determine/ quantify if a diverse mix of nonscience and science faculty and students in a single building creates an environment more conducive to interdisciplinary work and innovation than if in separate, more discipline specific buildings?”

Duke University engaged Lord Aeck Sargent in 2010 to design a series of phased renovations to Gross Hall which was originally abandoned and slated for demolition. These renovations have transformed the building into a vibrant community for innovative research, teaching and making. This multi-departmental “hub” in the heart of Duke’s campus brings together programs including the Pratt School of Engineering, the Nicholas School of the Environment, Innovation & Entrepreneurship, Physics, the Energy Initiative, and Sustainability & Commerce. A key vision for the project was a facility which will evolve with the students as they gain and share experiences while striving to solve problems through discovery.

Completed in 2014, Gross Hall now includes numerous highly adaptable, modular wet and dry research labs to support constantly changing and evolving research initiatives. The lower basement levels of the building have been renovated as interconnected research and teaching space associated with large and small scale electro-mechanical equipment and fabrication. This confluence creates a unique facility at Duke with the ability to house a wide range of course-related, co-curricular and entrepreneurial-fabrication focused projects and activities.

Highly-collaborative, formal and informal social spaces complement the technology-rich classrooms, project-based teaming spaces, faculty and staff offices and administrative space. A sky-lit atrium “Winter Garden” connects the second and third floors and intentionally brings together diverse campus groups for gathering and teaching activities.

An interdisciplinary maker space – The Foundry - has created a buzz of excitement on the Duke campus among faculty and students interested in a center for informal exploration, fabrication and “tinkering.”





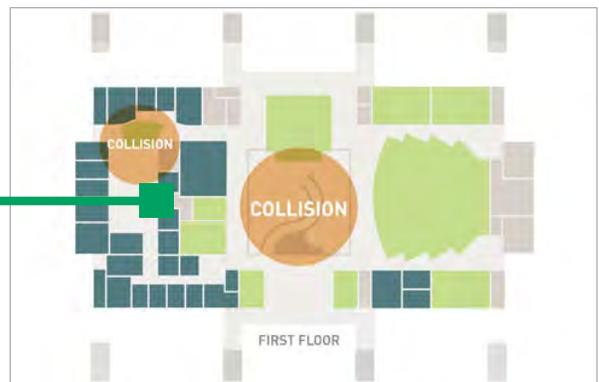
RESEARCH ON DISPLAY



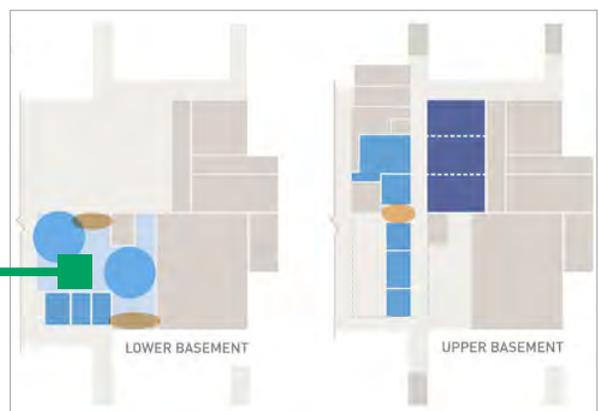
SEMI-TRANSPARENT FACULTY OFFICES



THE DESIGN CREATES A "START UP" ATMOSPHERE

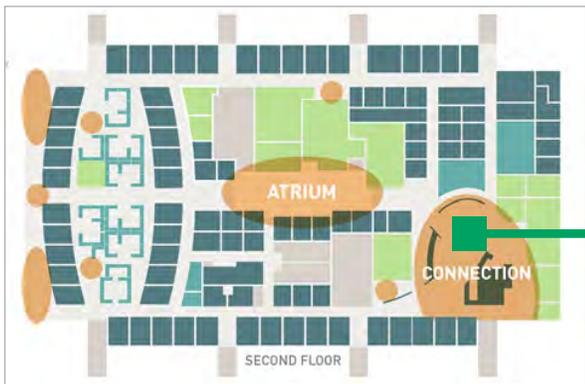


THE FOUNDRY HAS EXTENSIVE PROJECT LOCKERS, TEAM TABLES & WHITEBOARDS ALL AROUND

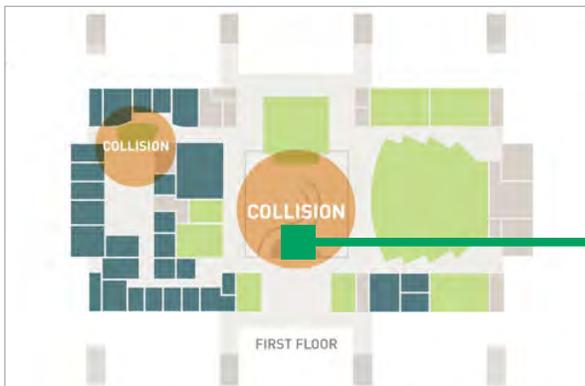




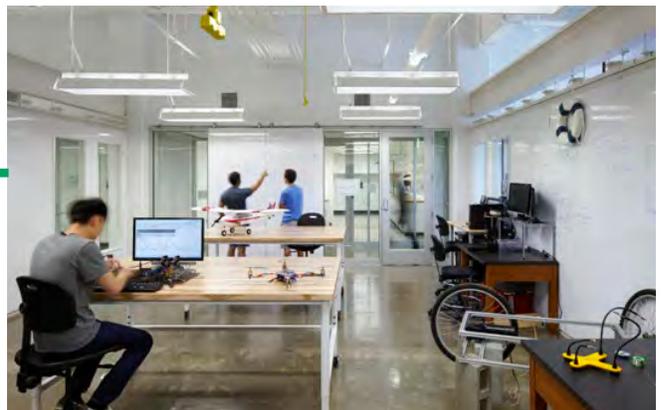
THE WINTER GARDEN IS THE HEART OF FLOORS 2 & 3



FORMAL AND INFORMAL MEETING AREAS



GROUP PROJECT ROOMS SURROUND THE LOBBY



TEAM ROOMS IN THE FOUNDRY CAN BE RESERVED FOR LONGER TEAM PROJECTS



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Driving Questions

1. How do we create a campus-wide “heart” for student engagement and innovation?
2. How do we enhance technology-enabled problem-solving skills for students?
3. What does an agile, timeless, learning and research environment look like?
4. What tools, spaces, relationships and events will attract, retain and support the highest caliber faculty & students?
5. How do we create deep learning through immersion in critical-thinking scenarios?
6. How do we create the destination for collaboration with industry, government, and academic partners to accelerate intellectual and economic development and help students build a bridge to a bright future?

Clemson University’s new Watt Family Innovation Center (WFIC) provides a unique environment in which advanced instructional technologies foster student engagement and industry partnerships that address real-world complex problems. The 70,000 GSF facility invites students to take ideas from concept to the marketplace by the use of its rich program spaces: Project Labs, high-tech Collaborative Learning rooms, Immersive Visualization Theater, Rapid Prototyping Lab, High Bay Lab, Skills Development Studio, High Tech Auditorium and Project Demonstration and Collaboration spaces. While the WFIC is primarily a University-wide resource for innovation, the building additionally serves as a home to experiment with new learning models for general engineering courses – exposing 1st year students to real world challenges that inspire deeper learning.

The design team worked rigorously with Clemson University to generate a cohesive design response to the driving questions facing the project. Through visioning sessions, research, and exploration, the team was able to apply new technologies, implement systems in new unique ways and uncover a wealth of opportunity through the establishment and collaboration of Industry Partnerships during the design and construction process. An innovative process and journey, enabled this innovative facility for Clemson University.

The building’s raised access floor system along with demountable walls allow rooms to be rapidly reconfigured. The glass walls, natural light, and views to the sky provide a vibrant atmosphere that puts the creative activities of the center on display. Wireless Audio and video connections to the 191 touch-controlled large-screen monitors is seamless and managed from a central Command Control Center. Collaboration software enables simultaneous editing on the “immersive collaboration walls” by multiple users and external partners. Full height Media Walls and immersive technology provide immediate visualization, editing and sharing of student projects. The 210 foot long exterior media mesh allows for the sharing of ideas at a campus scale, promoting innovation and curiosity.





Because of the aggressive vision for the Watt Family Innovation Center, Industry partners contributed materials, systems, furniture and technology through generous gifts-in-kind in support of research on how smart buildings enable learning. A collaborative process between Clemson University and the Design Team fostered these relationships and enabled increased value in the building as well as its long term academic sustainability. The Watt Family Innovation Center's design supports Clemson's 2020 plan, drives curricular innovations, and enhances leading-edge research.

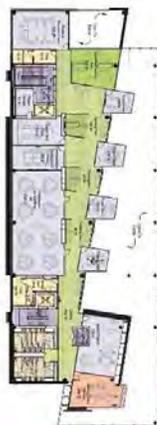
East Elevation of the Philips Color Kinetics mesh with views to the entire community engaging and immersing them into the WFIC experience.



The Atrium serves as the University Brand Center for visitors as well technology demonstration space. This space puts Innovation on Display.



First Floor



Second Floor



Third Floor



Fourth Floor





View through second floor project rooms



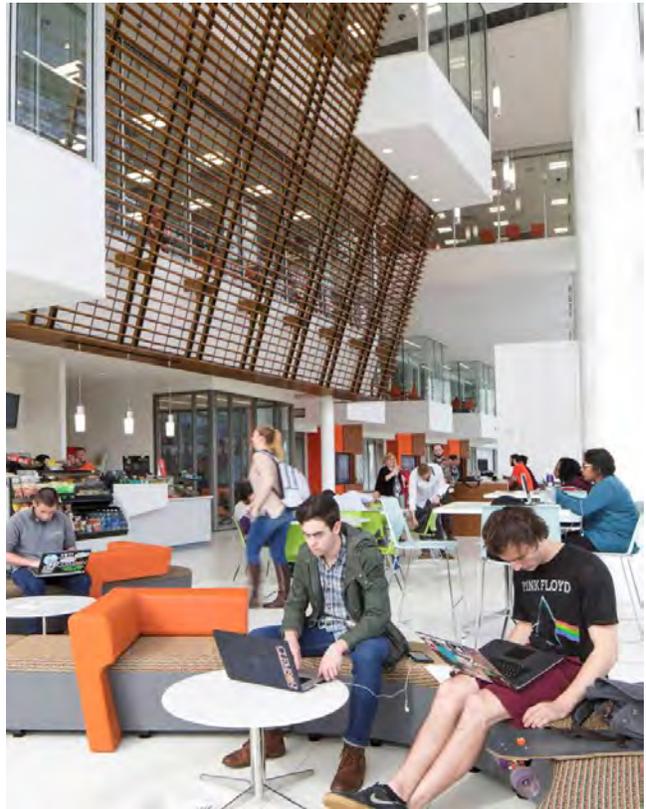
View through third floor project and multi-purpose rooms



Second floor project room collaboration with neighboring views



Collaborative/Active learning classroom with touch enabled technology



Student gathering space with café access and views into project space



Third floor corridor with technology, collaborations zones and views



Second floor corridor with collaboration zones and atrium views



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Driving Questions

1. How can we proactively plan for change?
2. How do we navigate institutional change, while maintaining a steady course throughout a prolonged or multi-phased project?
3. How can we create a “commons” that will physically connect a diverse range of different programs?
4. How can we celebrate diversity and manifest interdisciplinarity in our physical spaces?
5. How might we foster a sense of “community” in an urban campus with a predominately a commuter population?
6. What types of spaces should we create and co-locate that will encourage commuter students to stay and collaborate with peers beyond regular classtimes?
7. How do we create a vibrant heart for intellectual exchange, encouraging peer-to-peer, student-to-faculty, and faculty-to-faculty interactions and chance encounters?

Connecting Physical Space to Institutional Mission

Part of the City University of New York since 1964, John Jay College of Criminal Justice trains students in emergency response, forensic psychology, and cyber security. Enrollment increased dramatically after the September 11 terrorist attacks, prompting the school to create more space and expand its offerings. The new building – which doubled the size of John Jay’s existing facilities and addressed the College’s need for instructional and social spaces – is a critical component of the transformation of John Jay from a junior to a senior college of The City University of New York educational system. It provides an appropriate venue for the College to advance its mission of “educating for justice” by emphasizing faculty and student research and encouraging collaboration across disciplines.

Creating a New Campus Heart

A major goal of the project was to provide John Jay’s commuter student body with an identifiable, central academic and social hub fully integrated and connected to existing facilities. A 500-foot-long stepped social cascade, initiating at the fifth floor cafeteria and descending four stories to the main student entrance, provides ample leisure space for social and academic interaction between students, faculty, and school administrators.

Enhancing Circulation & Connections

A variety of smart classrooms flank the cascade, and the use of escalators comingled with the stepped stairs allows students to quickly get from one class to the next without having to wait for elevators. A 65,000-square-foot roof terrace tops the low-rise podium and acts as a crossroads for outdoor connections via a campus green.

Learning Outside the Classroom

John Jay’s new vertical campus is organized around a central multi-tiered social cascade, which provides essential circulation functions while creating opportunities for chance encounters between students and faculty. The cascade is the central campus commons that connects classrooms, science labs, double height academic quads, black box theater, faculty offices, administrative functions, campus services, cafeteria, and green roof. The cascade functions as unassigned, social space where students can study individually or gather in groups to shape informal learning settings outside the classroom.



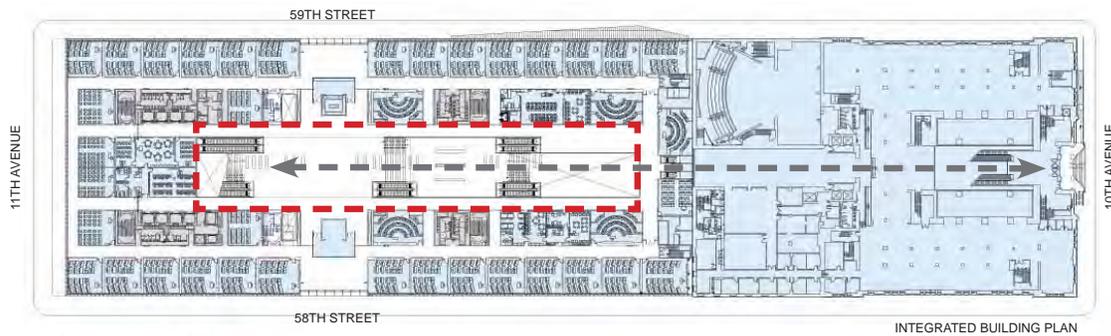
Encouraging Interdisciplinary Interaction

By mapping “soft boundaries” for shared, interdisciplinary programs and through careful delineations of “hard boundaries” for disciplined or controlled research – campus collaboration is maximized, while meeting dedicated space requirements for academic and research space. A broad range of needs helped to define potential physical intersections between departments, while identifying absolutes or “must-haves” for the institution as a whole. A rigorous efficiency factor was achieved by creating a palette of flexible spaces that serve multiple functions.



NEW CAMPUS ENTRY & LOBBY

MULTIPLE CIRCULATION PATHS



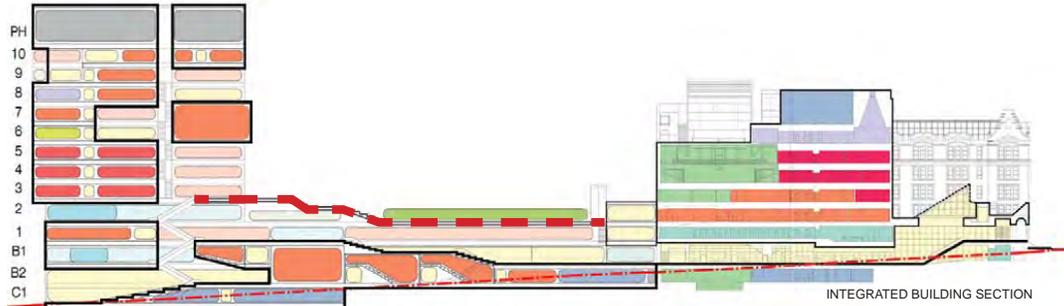
59TH STREET

58TH STREET

11TH AVENUE

10TH AVENUE

INTEGRATED BUILDING PLAN



INTEGRATED BUILDING SECTION

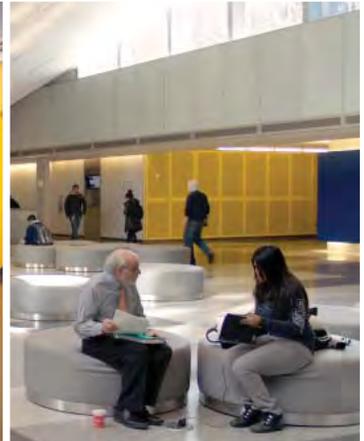
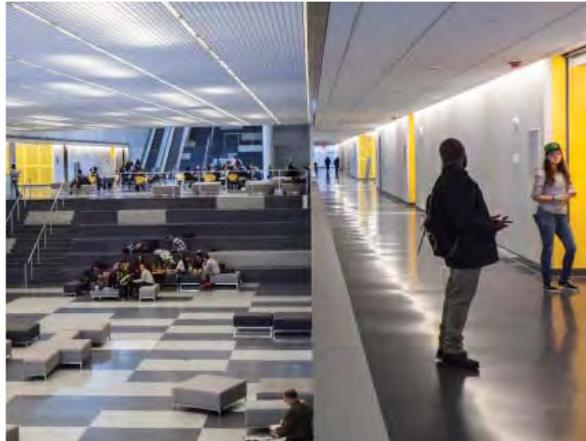


“Cascade” social space



Photomontage - showing social “Cascade” Below





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1. What does student-centered planning mean? How might we address in our planning the need for spaces that enable us to engage fully our entering and lower level students in the doing of engineering from the very first day?
2. Engineering itself is a multi-disciplinary community. How can our planning and the spaces resulting from our planning dissolve barriers between disciplines, and build community across disciplines that is sustainable over the long-term?
3. Becoming socialized into a community of STEM practitioners requires spaces where students can build and test the things they draw and design. How can we introduce students to the environments where engineering is practiced in the world beyond the campus? How are such spaces different from those of past generations of spaces for educating engineers?
4. How many different kinds of spaces, traffic patterns, adjacencies, etc. need to be considered in developing an ecosystem of learning spaces for 21st century learners in fields of engineering?

Consistent with the Samuel Ginn College of Engineering's goal to provide the best student-centered engineering experience in America, the construction of the engineering student achievement center will create a comprehensive facility capable of significantly transforming the personal and professional success of tomorrow's Auburn engineers.

Engineering education at Auburn University extends well beyond the traditional classroom. With a focus on student achievement, Auburn Engineering is dedicated to providing students with a high level of professional development and academic support throughout their college experience. To enhance these efforts from the time they initially engage with the college until they begin their career in the engineering profession, the college has embraced a vision to create a state-of-the-art student achievement center designed to meet the educational and professional development needs of all of our undergraduate and graduate students.

The more time students spend actively engaged in individualized activities with faculty and fellow students, the higher their educational success rate. Greater opportunities for collaboration, time spent working on hands-on projects, and improved access to faculty, mentors, tutors and professional practitioners will significantly enhance their overall educational experience.

This multifaceted center will bring together a multitude of important student support programs to create a student-centered environment that strategically addresses their professional development needs throughout their academic careers at Auburn. Perhaps equally important, this facility will give students a sense of "home" that encourages them to spend more time among faculty and students, creating an element of synergy among engineering faculty and students.



Designed to serve all engineering students from every field of study, the center will incorporate high-contact initiatives that support students through:

Student Recruiting

The ability to attract the finest students begins with focused, intentional recruiting efforts at both the undergraduate and graduate level. This is often the college's first opportunity to make an impression. Concerted, individual recruiting enables us to bring high-achieving students to Auburn who strengthen our instructional and research programs.

Curriculum Advising

Providing guidance to students as they choose a major, determine class load and make plans for a specific course of study is critically important in the early stages of their college career. Dependable, ongoing access to advisers increases the likelihood that students will seek guidance and adhere to an individualized academic plan.

Career Mentoring

Career and professional mentoring is vital to keeping students highly focused and motivated toward their long-term goals while undertaking the rigors of an intensive engineering curriculum. This program will enable students to actively explore various career opportunities and technical challenges that engineering programs offer. Through one-on-one mentoring sessions with seasoned professionals, organized plant trips to observe engineering in action and group discussions with practicing engineers, the Career Mentoring Center will help students align with a field of engineering that fits their interests and goals.

Engineering Tutoring Center

A challenging engineering curriculum causes even top students to seek assistance to reach their full potential. Ready access to tutoring can significantly improve the performance, and success, of students. This center will provide tutoring at all levels through a formalized program utilizing exceptional teaching assistants.

Student Maker Spaces

The lower level of the center will be designed to provide a unique venue for students to participate in the practical application of engineering through team-oriented design projects. With increased access to supervised work spaces, machine shops, additive manufacturing tools and electronics shops, students can engage in active-learning opportunities through creative, hands-on design projects that develop creativity in engineering design and innovation.

International Experience Office

It is important for students to experience the global context within which engineering is practiced in today's world. This office will connect Auburn students with the worldwide community and promote the study of topics related to global engineering, social challenges, and environmental awareness.

Engineering Leadership and Professional Development Center

Ongoing workshops and seminars with industry leaders and engineering professionals, targeted leadership training and development, and opportunities to engage in the Business-Engineering-Technology program will help students begin to develop as professional engineers early in their educational careers.

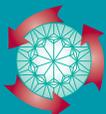
Industrial Relations and Innovation Center

Companies regularly visit Auburn's campus to recruit students, develop research contacts, explore intellectual property, and develop continuing education programs. This center, which would house an industrial liaison to act as a chief technology officer for the college, will provide a single point of contact for companies to engage with the College of Engineering. Creating a "front door for industry," this initiative will enhance technical innovation and development by providing a vehicle for industrial research contracts. It also will coordinate key industrial and economic development groups with the college.

Engineering Career Placement Office

An engineering-centric career placement office within the college will directly facilitate students' career and professional opportunities. Resources such as company information sessions, interviewing seminars, and targeted recruiting events, as well as regular engagement with industry and professional schools, will educate students about their post-graduation options. Additionally, students can engage directly with companies to improve placement rates with top-ranked corporations. This office will create a "one-stop shop" for students to investigate cooperative education, internships, as well as full-time job placement.

Auburn Engineering is committed to providing an exceptional education that prepares graduates for meaningful and productive careers while equipping them to contribute immediately to the global workforce. This requires defining engineering education in a changing world and training engineers inside and outside the classroom. This engineering student achievement center will enable the college to build the infrastructure to make this vision a reality and position the college to seek additional funding to support programs and initiatives housed within this center.





Extend a Campus of Quads and Paths



Leverage Movement and Visibility



Unify the Engineering Campus



Connect Across Programs





**Digital Classroom Building
Washington State University**

Firm: Vantage Technology Consulting Group
Firm Representative: Parke V. Rhoads, CTS

Learning Spaces Collaboratory Roundtable
Spring 2016: Focusing on the Future of Planning Learning Spaces
Georgia Institute of Technology

Driving Questions

1. Can an institution struggling with inertia take a quantum leap into modern classrooms?
2. How can an institution better serve the needs of its students – not just for improved learning but to also close gaps between the academic environment and the professional world most students will enter post-graduation?
3. How can a campus create a “common ground” where instruction and innovation are facilitated to succeed where past experiments and attempts to change culture have failed?
4. Is there a better way than “If you build it they will come” to mitigate risk (sunk cost for stuff they don’t need/use) and steward a place that will continue to grow technologically along with the institution, it’s teachers, it’s students, and the world?
5. Where is the next InfoCommons-like incubator happening?
6. How are emerging technology trends affecting / improving learning spaces?

The WSU Digital Classroom Building, open in 2017, will be a \$60-million space purpose-built as a new hightechnology learning commons on the campus of Washington State University. WSU has a campus-wide initiative to address the tremendous advances made in understanding how 21st century students learn. The vision of campus leaders for this striking new 80,000 sq. ft. facility is that it serves as a gateway, showcase venue, and catalyst for this initiative.

To ensure that vision was realized, we collaborated with campus leaders to focus on the “why” of the spaces we were designing, which was more important than focusing on the “what”— which most often become merely a laundry list of neat spaces. As technology designers, with this project we were offering a true path to innovation: classroom technology designed around the institutional goals for pedagogies (learning and teaching) into the future.

The innovations are an in-the-round active learning lecture hall with circular, blended video displays viewable from any seat, two large flat-floor collaborative active learning classrooms, multiple flexible classrooms, and a variety of dedicated, pedagogy-specific spaces. The space also nurtures the culture of innovation, including purpose-built areas where the campus can grow digital learning skills such as digital curriculum development offices and faculty innovation and student skills learning studios.

This project can also be used as a vehicle to take a step back and look at how the life-span for technology and endless pursuit of learning innovation stands at odds with the vast life-cycle of physical buildings and the traditional “once-and-done culture” of academic building design and construction. This project is using one of several “alternative procurement models” Vantage is experimenting with that offer a more philosophical approach to learning + space.

The building capitalizes on the rising slope of the site and different desire paths through the building to enhance the sense of excitement and collaboration. Users entering at varying levels will pass through many different showcases, places to collaborate (and watch collaboration happening), and opportunities to passively and actively interact with the resources of the Digital Classroom Building.





Rendering of the complete building placed at the gateway to the main "Palouse Walk" through campus.



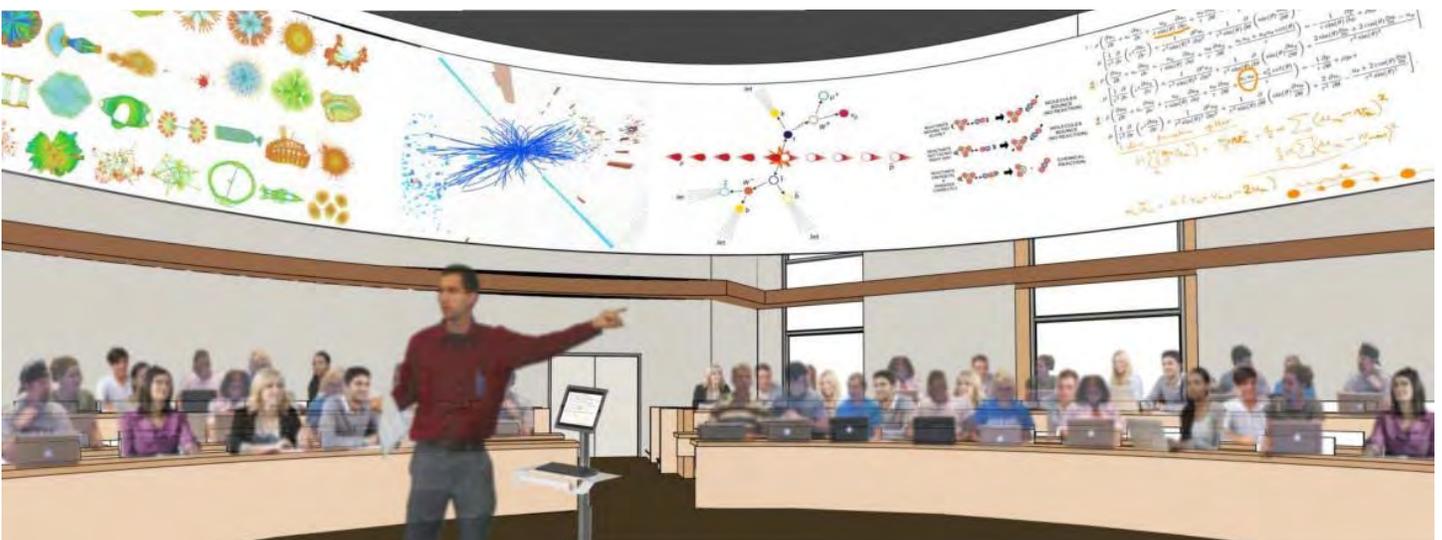
Interior view of the main "hill climb" stairs.



Sketch diagram of the interior circulation spaces.



Active Learning Spaces in the Digital Classroom Building will range from 45 to 120 students. The design of technology and interiors has been tailored to the pedagogy and the scale of each space, respecting the dynamism of large groups and the intimacy of smaller ones.



The circular seating arrangement and the overhead display in the digital hall enables communal storytelling, facilitated discovery, and a shared experience. For seating up to 300 students, this space is intended to bring the ethos of active learning into the large lecture hall format.



Learning Spaces Collaboratory Roundtable
Spring 2016: Focusing on the Future of Planning Learning Spaces
 Boston University

Driving Questions

1. How can we promote active learning environments—in classrooms and in teaching labs? What does it take to promote small group peer-to-peer interaction and learning?
2. How can spaces promote investigative, cross-disciplinary problem-based learning and problem-solving?
3. What does a 'technology-rich' learning environment mean? What are the tools needed in learning spaces to prepare students for increasing technology-dependent careers. How many ways and places can technologies be used in a facility to serve the campus community as well as to support outreach beyond the campus?
4. In our planning, how can we exploit opportunities for sharing, breaking down departmental silos? How can we maximize the use of flexible or case method classrooms, student study, break-out space, and shared administrative space? Does it work to distribute disciplines throughout the building rather than to cluster them by floor? What needs to be next to what?
5. How can a goal of increasing lower division student success in STEM disciplines be addressed in the planning process? What does it take to attract students to these fields and motivate them to persist? How do we create a supportive environment conducive to success?
6. How do our spaces reflect the social nature of learning, the need for collegiality, the unplanned interactions and conversations that shape and nurture communities?

The University of Mississippi is building a new state-of-the-art educational facility for Science, Technology, Engineering, and Mathematics (STEM) in Oxford, Mississippi, for occupancy in Fall 2018, on a site in the heart of the University's STEM precinct. The University's Vision for the project is to increase the number of STEM majors, and to enhance STEM literacy for all U Miss students.

The program for the building has been developed based on current enrollment with projected growth over the next 10 years, relying on a thorough utilization analysis of current and projected use. The types of functions in the building include academic didactic and laboratory teaching, student spaces, administrative functions, and building support functions. Planning priorities include:

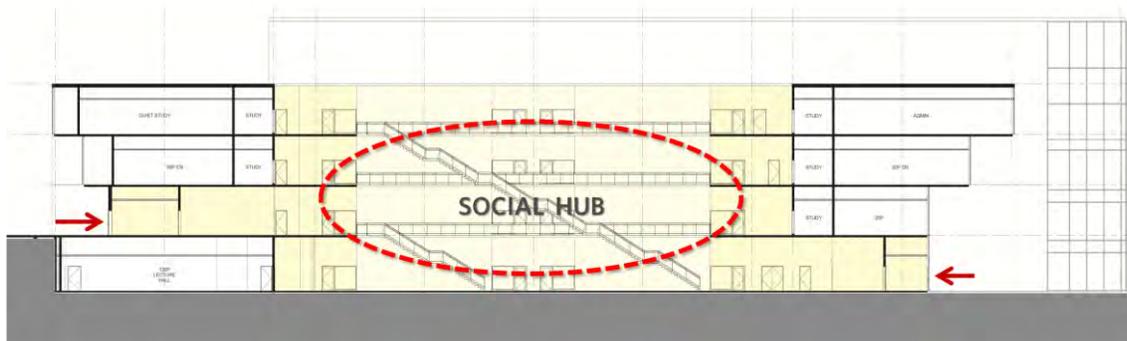
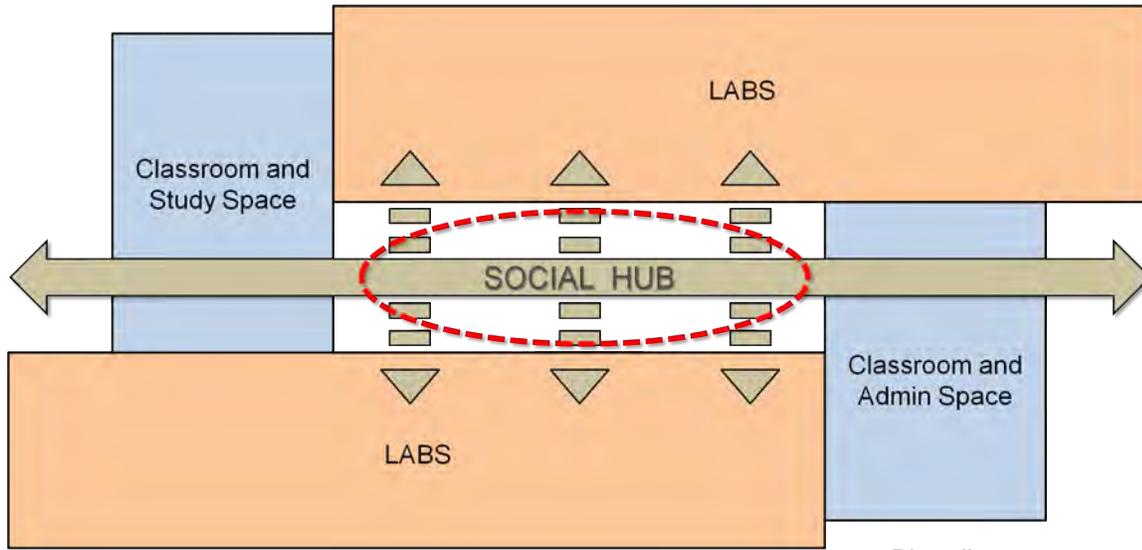
- Designing a building that fosters engagement and collaboration among STEM disciplines
- Creating intentional spaces for the display of Science in action
- Accommodating different pedagogical approaches
- Allowing for adaptation to future directions of Science and Engineering

The net area of the building is 121,730 net square feet (nsf). The building gross area is 203,738 (gsf), with an efficiency factor of 59.7%.

The building is a five story building consisting of four occupied floors and a fifth partial floor housing mechanical, electrical and plumbing systems serving the building

As the University is a signatory of the American Colleges and Universities Presidents' Climate Commitment (ACUPCC), and in compliance with the 2030 Challenge, the Energy Goals for the building are to meet the target of 70% carbon neutrality when the building is occupied; these goals are expressed as energy use intensity (EUI) and are targeted to be 90 kBtu/ft²/yr.





DEPARTMENT LEGEND

- ADMIN
- BIOLOGY
- BUILDING SUPPORT
- CHEMISTRY
- CIRCULATION
- CIS
- CIVIL/ENVR
- CLASSROOM - SHARED
- ENVIRONMENTAL
- GEN ENGINEERING
- GEOLOGY
- MECHANICAL ENGINEERING
- PHYSICS
- PROJECT LABS
- SHARED
- STUDENT SPACE





Social Hub



90-p Bio-TEAL Lab



Learning Spaces Collaboratory Roundtable
Spring 2016: Focusing on the Future of Planning Learning Spaces
 Boston University

Driving Questions

1. What can the design of the building do to promote a culture of innovation in academic programs?
2. How will students and faculty interact in this building, and how are team based collaborations supported within and outside of formal instruction times?
3. How can we design for the future and encourage innovation and new ways of learning?
4. How do we create an environment of entrepreneurial thinking, with the vibrancy and experimentation atmosphere of the West coast combined with the structure and richness of the Northeast academic history?
5. How can we create awareness, connections and encourage collaboration through our architecture?
6. How do we capture the “Maker” experience of rapidly prototyping ideas in a non-STEM building?
7. How essential is territorialization in a dynamic, academic environment, and what are the boundaries that should be defined by the physical environment?

Bryant University’s ambition to create a new type of entrepreneurial focused, collaborative learning environment has grown from an innovative and experimental academic culture that embraces evolution and advancement of new ideas and methodologies. Although traditionally focused on many programs that are of interest to students who plan on entering the business world, the Academic Innovation Center embraces a diversity of curricular focus. The building grows from years of experimenting with many different configurations of flexible, flat floor classrooms with movable furnishings, and encouraging faculty and students to utilize classroom time in experiential, problem solving exercises.

Promoting a culture of innovation in academic programs

One approach that Bryant University opted for in the design of the AIC is to eliminate faculty offices from the building, although temporary, shared “nesting” space is provided to temporarily host faculty during their class time and to provide them with personal space before or after scheduled classes, since offices are located elsewhere in other buildings. One reason for doing so is to make these dynamic learning spaces curriculum driven and need driven (in terms of features), which promotes and encourages experimentation as the classrooms themselves do not belong to any particular department or program. The idea is to promote competition and new vision to have a course scheduled in the spaces, and to accommodate traditional, lecture based instruction elsewhere on campus.



The AIC is designed to promote the entrepreneurial spirit that characterizes the renowned Bryant experience for both students and faculty. Currently in construction, the AIC will open in Fall 2016.



Since Bryant has been experimenting with rapidly adaptable learning environments, through recent campus renovations, the AIC project benefited from lessons learned, including:

- Maximize clear structural dimensions to facilitate combining adjacent rooms if larger spaces are needed in a few years.
- Make all tiers in classrooms easily removable to switch to flat floor environments if desired.
- Maximize writing surfaces throughout the building.
- Limit the negative impact of technology by creating spaces that encourage low-tech human interaction and promote hands on mapping of strategies and ideas.

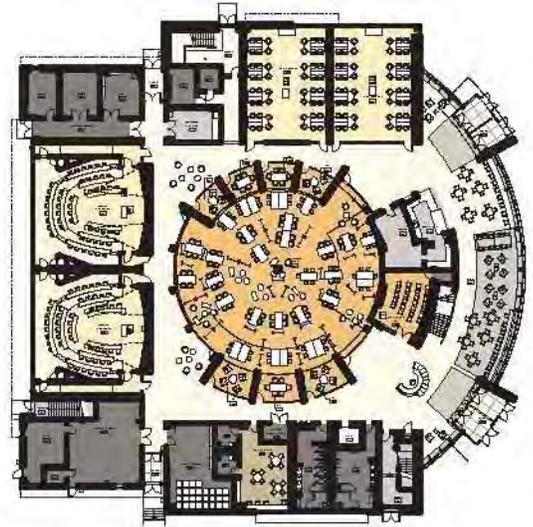
Strategies for faculty and students interaction with team based collaborations within and outside of formal instruction times

Students and faculty will interact formally during scheduled course time in one of several classroom spaces, all configured to promote active learning through team based problem solving. These instructional spaces provide student teams with seating arrangements at table formations that cluster, but are movable and adaptable. Adjacent writing surfaces surround all classroom space and limited use of technology encourages teams to “map out” strategies on the walls themselves. Following formal instruction times, teams can utilize “break out” spaces, clad in movable and openable glass walls configured with a wide variety of seating, tables and technology configurations. This allows for inclusion of both internal and external protagonists, research, and provides a variety of team work activities are readily supported preparation of materials for response to project challenges. In addition, the Innovation Forum encourages transient, and impromptu strategic meetings, for teams and individuals with movable furniture and writing surfaces. Almost the entire building benefits from transparency and an atmosphere of “see and be seen” which encourages both awareness and raises the level of energy among groups. However, care was taken to manage unwanted acoustic interruptions with many spaces being enclosed for aural privacy, but not forcing groups into visual seclusion.

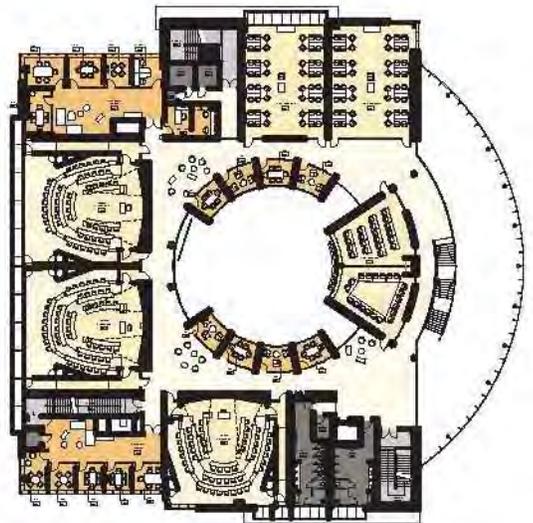
Creating an environment of entrepreneurial thinking, with the vibrancy and experimentation atmosphere of the West coast combined with the structure and richness of the Northeast academic history

Bryant University and EYP wanted to learn from earlier academic building projects that broke significant new ground in creating dynamic, experimental learning environments, especially Harvard Business School’s Innovation Lab. For Bryant, the goal was to bring a mixture of physical experiences into the AIC, ranging from a sleek, corporate feel (especially for executive education) with sophisticated furnishings and materials that create a refined sense of awareness that “ideas matter” to a more “rough and tumble”, loft-like feel (partially achieved through the use of wood flooring in the Innovation Forum) that encourages rapid prototyping and a “maker space” encouragement to try new things and discard ideas and approaches that aren’t working in favor of new ideas.

By intertwining these seemingly different and distinct physical and experiential environments, all those who use the AIC stand to benefit from cross pollination and the enhanced dynamic of interplay and exchange.



Level 1

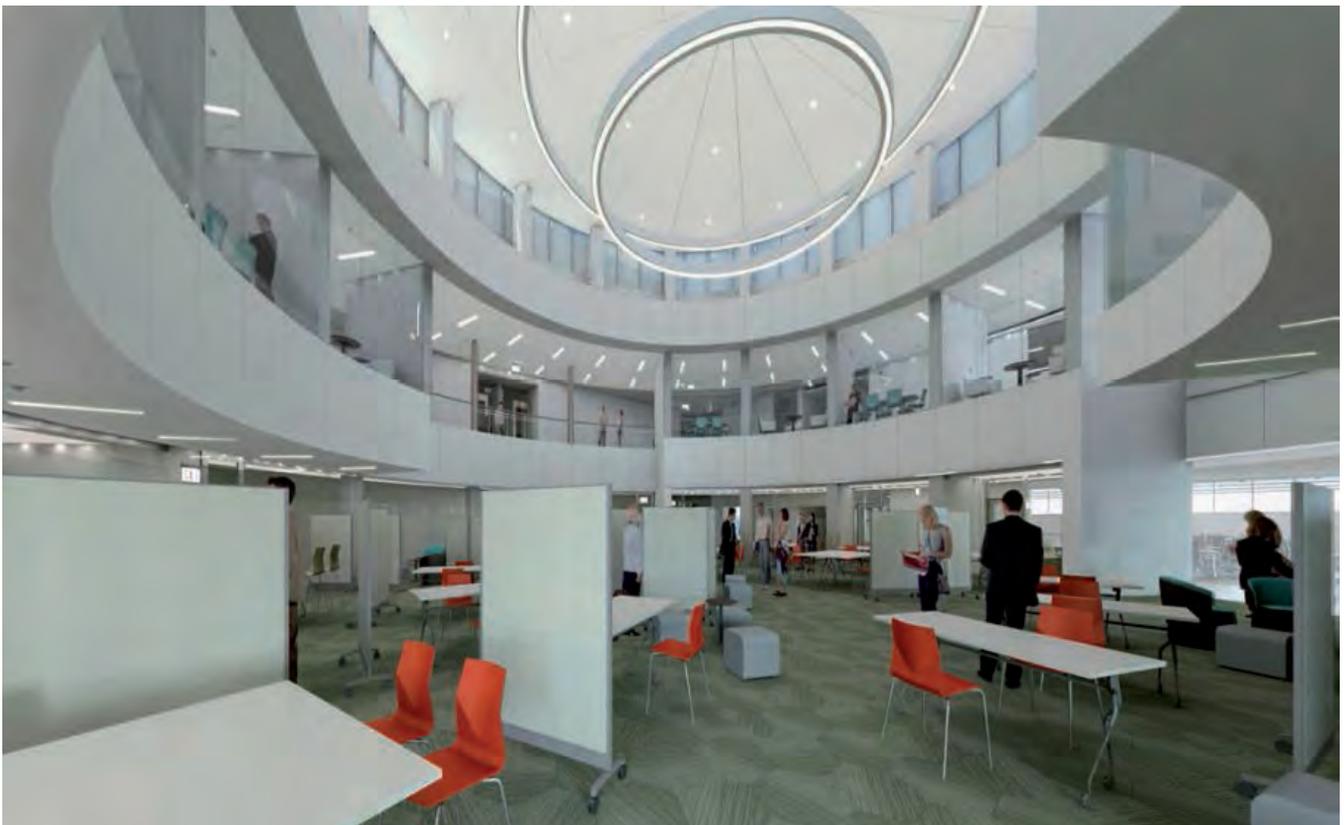


Level 2





The significant amount of glass, interior and exterior, creates transparency throughout the building and to the surrounding environment while a cafe provides encouragement for students from all disciplines and programs to use the building for study and teamwork.



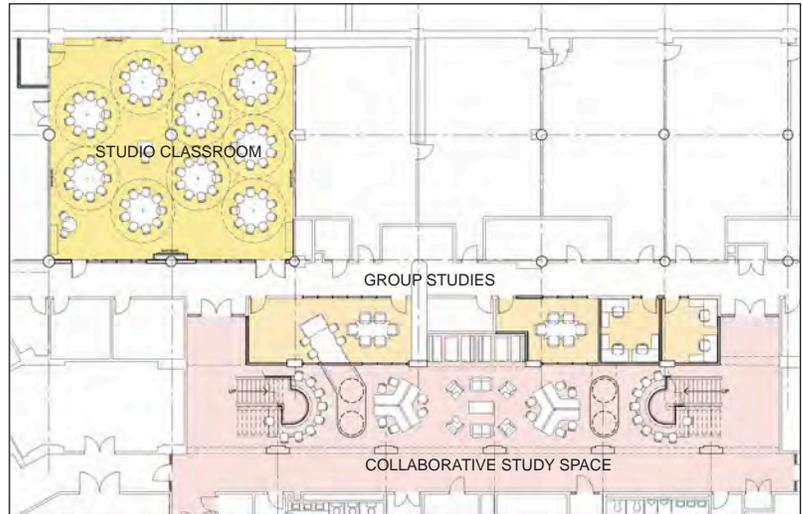
The AIC creates a flexible environment that blurs the line between learning and collaboration spaces and fosters an entrepreneurial spirit throughout that generates an active engaged learning environment.



Learning Spaces Collaboratory Roundtable
Spring 2016: Focusing on the Future of Planning Learning Spaces
Boston University

Driving Questions

1. What are the space planning criteria for this learning environment? How will instructors and teaching assistants interact with students in the physical and virtual spaces? How will students interact with one another and with the room's advanced technology?
2. Multiple locations in the building were evaluated for suitability based on the above questions. Only one location could potentially meet the new classroom's spatial requirements. Unfortunately, it is a basement location with a column in what would be the middle of the room. For the architects, driving questions are: can this location/ space be transformed into a great learning environment? What kind of furniture will best support the formal and informal learning activities and problem-driven learners?
3. Is there sufficient space available nearby to support extended learning opportunities? With an 81 – student capacity, the ebb and flow of students needed to be taken into account. What opportunity would there be to signal the larger academic community about this new type of learning space?
4. As a prototype, how will this new space be accessed and utilized by the University community beyond the Physics Department?



590 COMMONWEALTH AVE., PARTIAL BASEMENT FLOOR PLAN



81-SEAT STUDIO CLASSROOM



STUDIO CLASSROOM PODIUM



Project Description

Built for the BU Physics program, this Student-Centered Active Learning Environment for Undergraduate Programs (SCALE-UP) merges several pre-existing labs into a single 2,200 SF lab and adjacent 2,800 SF study space. Designed to seat 81 students, the technologically-rich environment merges all classroom computers and projectors into one shared system, innovatively using the university's extensive AV/IT data network. In this way, student laptops are leveraged into an interactive learning environment, rather than being a source of distraction. In support of the SCALE-UP teaching philosophy, the adjacent collaborative study area features open group work stations, lounge furniture, booths plus individual seating, and group study rooms.

The creation of the Interactive Studio Classroom was a highly collaborative process. It was also a process of creating something new for the University: their first active learning environment. Everyone involved understood that we were developing a prototype for the university. On paper, the project is a straight-forward renovation. In reality, the design team, Physics Department, College of Arts and Sciences, Facilities Management, and the Department of Educational Media and Technologies had to think through a wholly new way of teaching and learning, how the new technologies would be integrated with campus standards, and how this new space would be configured and furnished.



EXISTING ATRIUM STUDY SPACE - LIGHTING, ACOUSTICS, FINISHES AND FURNITURE ALL PRESENTED PROBLEMS



COLLABORATIVE STUDY SPACE - BOOTHS AND ADJACENT GROUP STUDY ROOMS CAPTURED UNDERUTILIZED SPACES ABUTTING THE ATRIUM

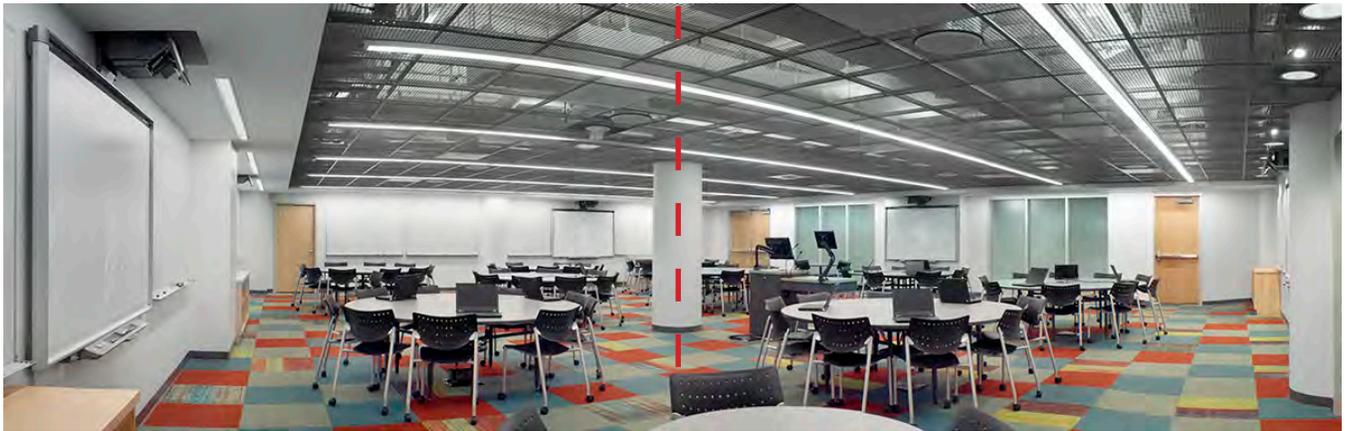


COLLABORATIVE STUDY SPACE - NEW LIGHTING AND A VARIETY OF SEATING OPTIONS WERE ESSENTIAL TO THE SPACE'S SUCCESS





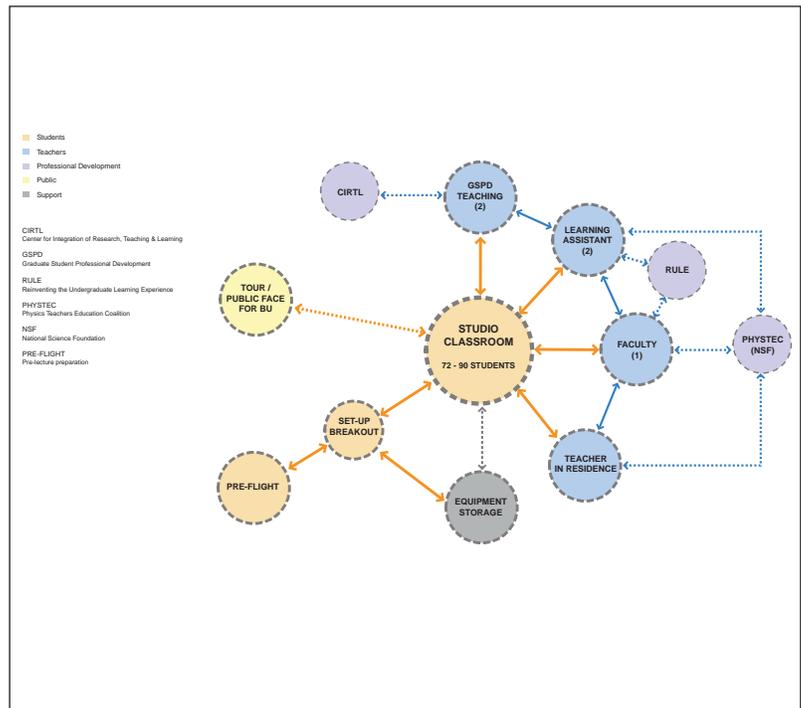
EXISTING LAB - WALL BETWEEN LABS WAS REMOVED, BUT CENTRAL COLUMN NEEDED TO BE RETAINED.



INTERACTIVE STUDIO CLASSROOM - POWER AND DATA ARE DISTRIBUTED THROUGH A 1.6" RAISED FLOOR. FINISHES INCLUDE WRITABLE GLASS AND A METAL MESH CEILING GRID WITH LIGHTING ABOVE THE GRID TO GIVE THE ROOM THE FEELING OF MORE HEIGHT.

Goal

The goal of studio physics is to integrate technological innovations with new pedagogical tools that emphasize active-learning techniques. Professors, teaching assistants, and learning assistants circulate around the room, engaging students by asking probing questions and guiding their self- and peerlearning. This interactive and Socratic style of teaching forces students to think more deeply about the core concepts they are learning than what is possible in lectures, leading to a classroom atmosphere full of lively interactions between students and teachers.



PROGRAM DIAGRAM CREATED TO CAPTURE PARTICIPANTS AND KEY STAKEHOLDERS.





Learning Spaces Collaboratory Roundtable
Spring 2016: Focusing on the Future of Planning Learning Spaces
Boston University

Driving Questions

1. To enhance the educational experience, specifically for a large student population, what elements need to be considered in planning a learning community?
2. How have technological advances in the science workplace changed the design of the undergraduate curriculum? How does this reshape space for different types of learning?
3. How does the need for safety and efficiency drive operations and space planning?
4. How do we create a welcoming environment and flexible learning spaces? How big is too big?
5. How do we rigorously and responsibly plan for an unknown future?
6. To support student success, what elements and adjacencies should an institution/design team consider for an academic building?



Collaborative Tiers (Paired Rows on a Tier) for 200 and 300-Seat Auditoriums

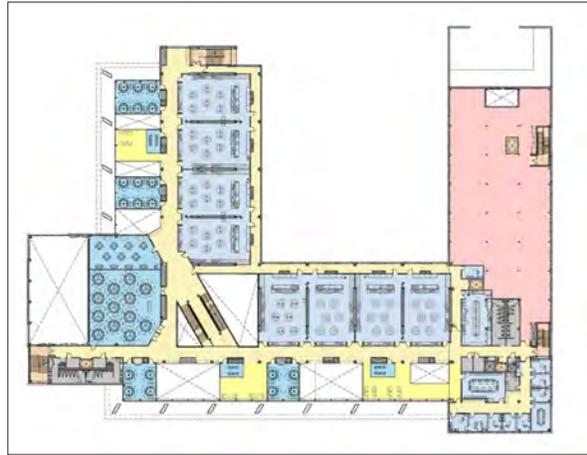
The University of Kentucky (UK) set out to make the most of the Kentucky Promise state funding by creating a state-of-the-art science facility that will provide a positive impact for the greatest number of their students. With planned enrollment growth, nearly 6,000 students a year will be taking entry-level science courses in chemistry and biology. The new Academic Science Center will become the recognizable center for the sciences at UK and an asset for both retention and recruitment for students and faculty. The new facility will provide teaching labs for highly subscribed foundation courses in chemistry and biology. The building has two large lecture halls (200-seat and 300-seat) with collaborative tiers that can accommodate both lecture and team-based exercises within the same space serving the entire University community. The building also has several teambased learning classrooms, lab support space, departmental offices, an extensive advising center to support student success in the sciences, and shelved space earmarked for future research programs.

The ground-breaking innovation in this building is a direct result of the needs of the new general biology curriculum. The new curriculum reflects the changing needs in today's data-rich world of science. For the most part, the traditional, general biology teaching labs have become team-based learning classrooms. The large volume of students increases the importance of creating a building that responds to the need for creating a safe, operationally efficient and welcoming environment for science and non-science students alike. One of the features to support safety, improved operational and energy efficiency, is the service corridor, which allows all the teaching labs on a floor to be served by a single prep area. It has its own entrance separate from the student entrance off the main corridors. This service corridor also acts as a thermal sweater and provides an abundance of natural light. The main circulation areas have been sized to comfortably accommodate the large number of students this building will serve. The building also has several different types of informal learning spaces that will entice students into the building and encourage them to linger and gather for independent and group study. The mix of formal and informal spaces, activelearning classrooms and hands-on instructional labs foster a vibrant science community.

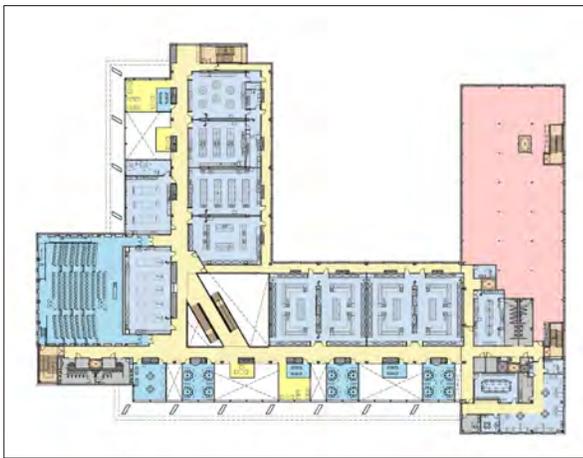




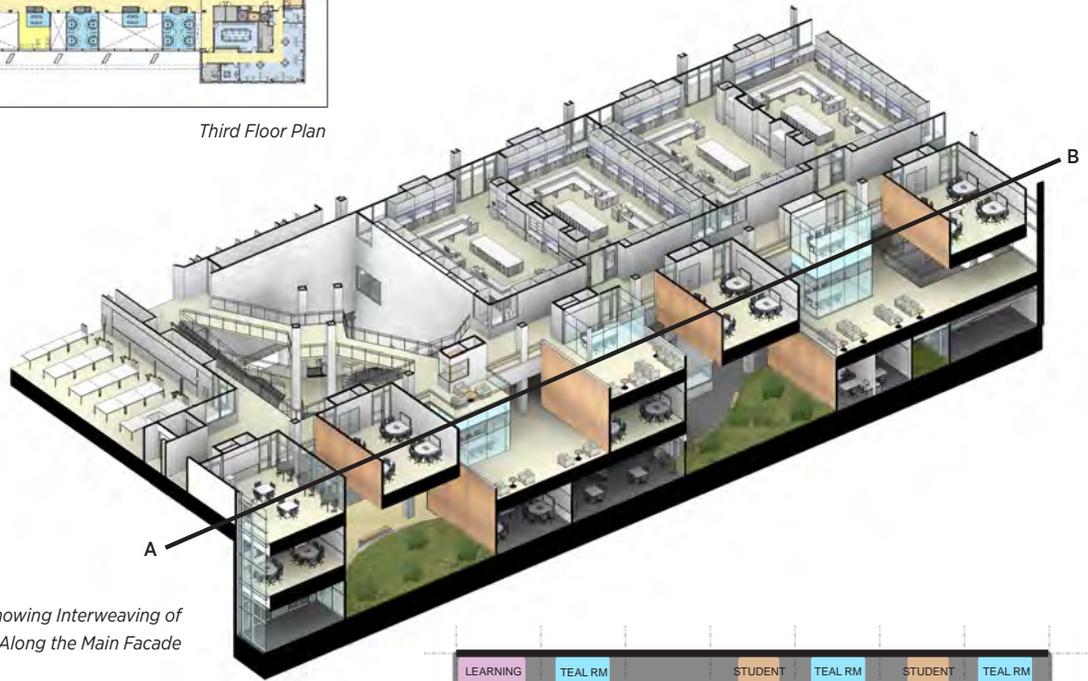
First Floor Plan



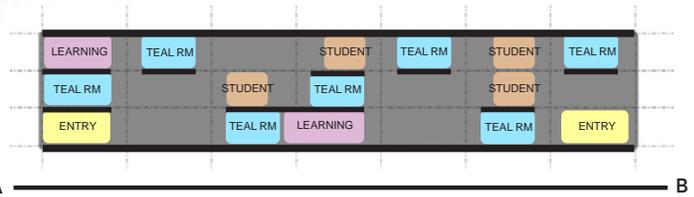
Second Floor Plan



Third Floor Plan



Axonometric Showing Interweaving of Formal and Informal Space Along the Main Facade



A ————— B

Sectional Strategy



The building is sited at the corner of Rose Street and Huguelet Drive, at the southern corner of campus. It creates an edge between the main campus and the medical campus. The U-shaped massing of the building responds to the orientation and context, which reinforces the edge and at the same time creates a more intimate green space oriented towards adjacent residence halls that acts as both a respite and pass-through for students coming from that direction. The brick envelope and detailing is reflective of the character of campus. The “front porch” entry is scaled to address the neighboring science buildings across Rose Street and to express the nature of the interior formal and informal learning spaces within the building, linking the interior and exterior. The campus master plan calls for the closing of Rose Street, turning it into a pedestrian thoroughfare, which reinforces the importance of this main façade and the building as an important academic center for this portion of campus.



Main Campus Facing Façade Showing Interplay of Formal and Informal Spaces Within; Undergraduate Sciences “Front Porch”



TEAL (Technology Enhanced Active Learning) Classrooms Supplement Traditional Entry-Level Biology Labs



Learning Spaces Collaboratory Roundtable
Spring 2016: Focusing on the Future of Planning Learning Spaces
Boston University

Driving Questions

1. How do we get faculty and students to move throughout the building? How do we get students to stay within it?
2. How can the project accommodate more than just science?
3. What are the “third spaces” needed to encourage collaboration?
4. How do you accommodate for materials and equipment necessary for instruction or research in a flexible classroom or lab?
5. How is shared space operated or maintained in a transdisciplinary space?

The E. Craig Wall Jr. Academic Center answers Davidson College’s vision to re-imagine liberal arts education by creating an environment of learning and discovery that will expose students to the diversity of science and inspire cross-disciplinary research initiatives addressing real world problems. The design makes these activities visible and accessible, blurs boundaries between disciplines, encourages closer interactions between student and faculty, and acts as a campus magnet to engage the broader academic community.

To achieve this vision, the departments of Biology, Chemistry, Psychology, and Environmental Studies have been brought together into two new wings dedicated to teaching and research, with faculty offices and incubator space for cross-disciplinary research initiatives consolidated in the existing Martin Building. An open atrium acts as the nexus and point of entry for the complex, with a stepped forum at its heart, providing space for open study, exhibits, and presentations for use by the broader academic community.

Informal collaboration and gathering spaces along circulation paths are infused throughout the complex, creating academic “neighborhoods”, around which research, seminar, and group study spaces are clustered to create new synergies. The teaching labs are active learning environments, with moveable lab benches, and direct connections between labs and classrooms allowing for a unified teaching space accommodating a variety of teaching styles. Lab-to-lab connections provide the opportunity for team-taught labs and greater potential for interdisciplinary programs.

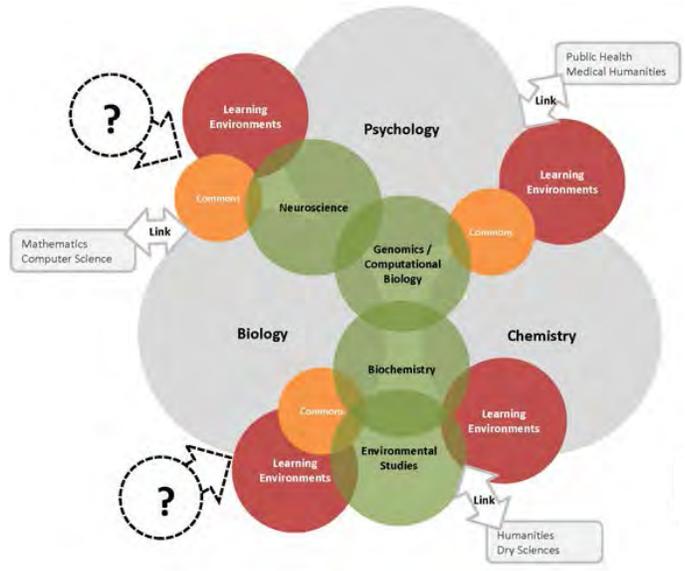
The laboratory prep and support zone runs along the front face of the teaching labs creating an unimpeded zone that is adaptable over time. Direct access to equipment in the prep and support spaces mean the labs are less intensive, raising the efficiency of the budget and flexibility in space use. Not being hard-wired for one particular discipline the loft concept allows labs to be easily reconfigured as the demands of disciplines change.

The five classrooms are a campus resource, allowing for non-science courses and programs to be taught in the new building, exposing a larger community to a variety of disciplines. This discussion will focus on how the initial drivers for the project, specifically those surrounding movement and connectivity, have evolved and manifested throughout the project.

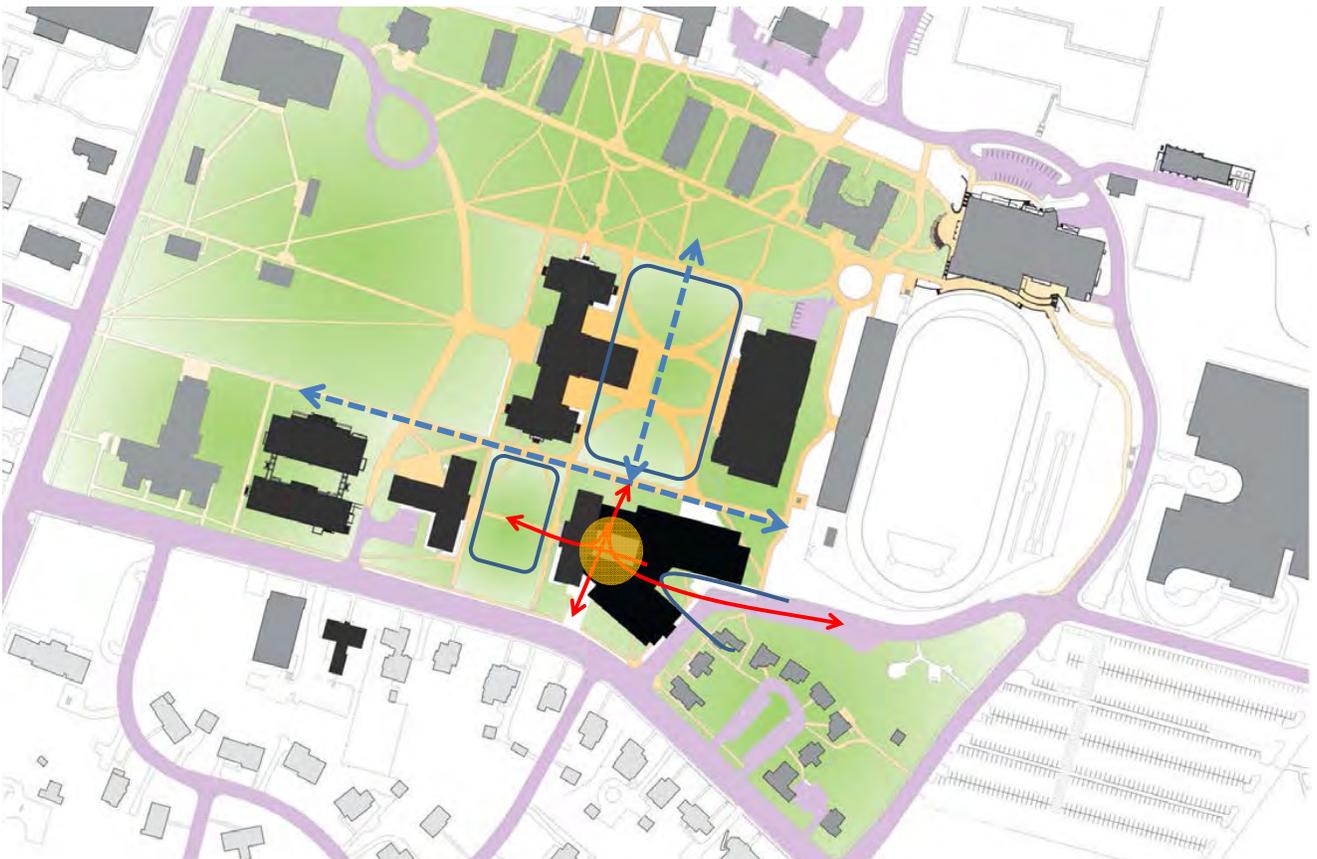




Bringing the Arts into Science



Early diagram of how overlapping resources could begin sharing services

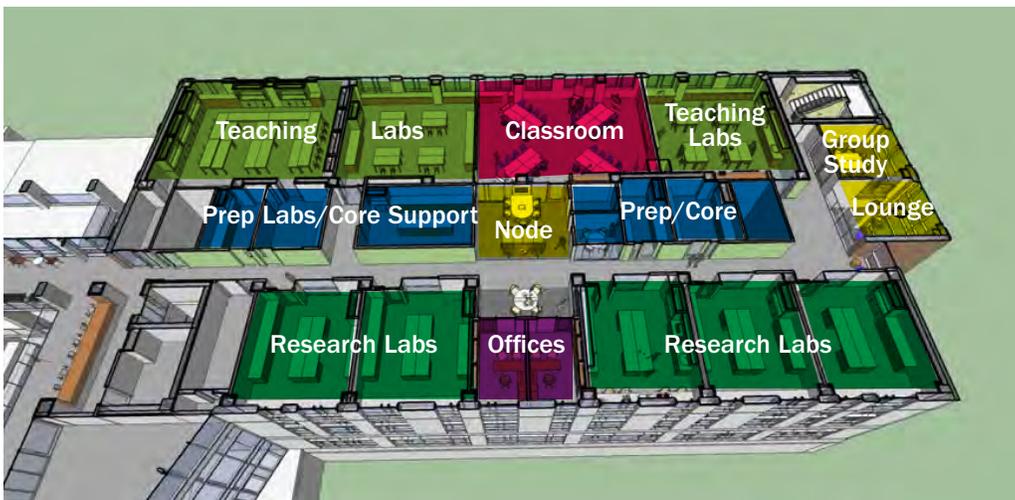


Opportunities for campus movement and connections





Collaboration Space adjacent to Classroom



Program Organization



Classroom/Laboratory Connectivity



Learning Spaces Collaboratory Roundtable
Spring 2016: Focusing on the Future of Planning Learning Spaces
 Boston University

Driving Questions

1. How do we blur the lines between classroom learning and research activities?
2. How can we bring attention to our project teams and highlight the opportunities for collaborative activities with industry, government, and academic colleagues across the country?
3. How do we highlight the collaborative nature of modern science and support the curiosity-driven impulses of true scientific inquiry in a new space?
4. What types of spaces will encourage experimentation with pedagogy and student engagement? We don't pretend to know how learning research will change the nature of STEM instruction in the future, but we want to be positioned to take advantage of emerging best practices without further renovation.
5. How do we support unstructured learning and "pop-up" learning communities in our new space?
6. How can first-year students be introduced to communities of practice?
7. How can we establish opportunities for more informal whiteboard moments between students and faculty outside of the classroom? That is, how do we make visible and present the creative origins of science?
8. How do we bring our technical entrepreneurship program into closer communication with our project teams?

The Straz Center represents a new center for undergraduate learning within the Natural Sciences at Carthage College. The existing David A. Straz, Jr. Center for the Natural and Social Sciences has been renovated and expanded to create a new architectural identity for the Natural Sciences. The project provides modern classrooms, teaching labs, undergraduate research spaces and collaborative learning environments. Collaborative spaces, common learning lounges, conference rooms and offices are oriented to take advantage of natural light and lake views. A new planetarium features and is architecturally expressed along the west façade to create a new "street address" for the Natural Sciences along Campus Drive. The Straz Center Modernization + Expansion project renovated 42,179 net square feet of space and constructed an additional 28,119 net square feet of new building. Overall, the project includes 102,855 gross square feet of building area. Construction of the project was phased according a schedule determined by the College.

The David A. Straz, Jr. Center for the Natural and Social Sciences is functionally the south end of a larger complex of connected structures including the Clausen Center for World business and the existing Theater directly to the north. The new addition to the existing facility and renovation work within the existing David A. Straz, Jr. Center for the Natural and Social Sciences is limited to the north by the existing south wall of the Theater. No new work is to be performed north of this existing dividing wall. The site for the Straz Center Modernization Project is bounded on the west by Campus Drive, to the east by the shore line of Lake Michigan and to the south by existing Lentz Hall.

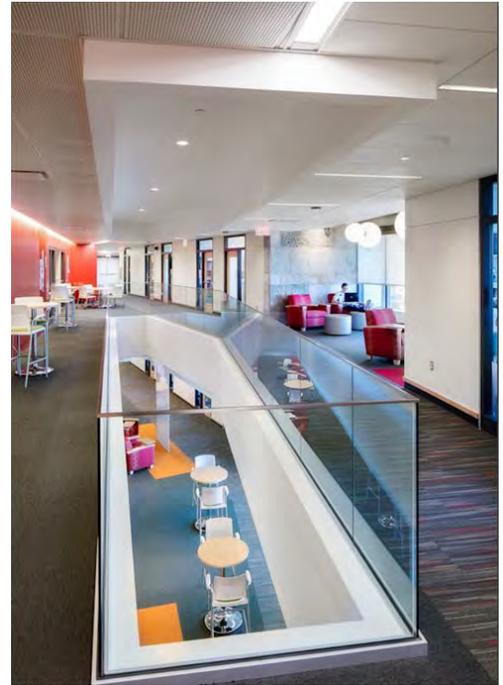
"The future of undergraduate science education is being created right here and right now at Carthage."

— President Gregory Woodward
 Carthage College





The new science center increased classroom and lab space by 40%



Interactive zones help teaching continue outside of the classroom and provide space to collaborate any time of day or night.



A stepped seating area with advanced media capabilities.



A two-story, glass-enclosed atrium for exhibits, public gatherings, student poster presentations, and planetarium shows.



Science on display



Research, Innovation



Collaborative learning areas for informal discussions, continued learning, and project work.



An outdoor classroom overlooking Lake Michigan with natural stone seating.



Interdisciplinary laboratories for research in materials science, nanotechnology, engineering design, molecular biology, and atomic microscopy.



Interactive space to work with students on research projects and homework assignments outside of class.



Teaching lab



Anatomy lab



Learning Spaces Collaboratory Roundtable
Spring 2016: Focusing on the Future of Planning Learning Spaces
Boston University

Driving Questions

1. What are the beneficial impacts/ synergies of blending library and campus center programs?
2. Can a mixed-use building save money and space by capitalizing on those impacts/synergies?
3. Do these programmatic overlaps intensify the use of the building? Is there increased use of the library by more diverse groups?
4. Can learning spaces be shared effectively between departments and programs?
5. What is the right balance of food and social space to animate learning spaces?
6. Do adjacent outdoor terraces and porches really enhance learning spaces in temperate climates?

An Ambitious Transformation

Young Harris College is a private college located in the remarkable mountain setting of north Georgia. In 2008, YHC was awarded four-year status as part of an ambitious plan to expand its offerings, double its student body, and emerge as a leading, regional liberal arts college.

The centerpiece of this new program is the 125,000sf Campus Center, designed to catapult the student experience into the 21st century. The Center is the social and intellectual heart of campus.

Rich Mix of Uses

The Campus Center connects four distinct areas: a 60,000sf multi-purpose student center, an expanded dining hall boasting a wide variety of food stations, a 350-seat, versatile event facility, and a 40,000sf library and learning commons.

Planning Process

The planning process brought together a cross-section of the community including an engaged faculty and a diverse group of student leaders and learners. The design team fabricated programmatic “game pieces” to use in a series of hands-on exercises—especially designed to find the overlaps and synergies between uses—which led to a series of combined active classroom and group study spaces shared by both the Campus Center and the Library.

This approach led to an innovative solution where the 24-hour zone of the Library feeds off of the Campus Commons with the Bistro platform of the dining hall available for after-hours use. Two academic meeting rooms are strategically located off of the upper commons for open and easy access by faculty and students when scheduled—and are also immediately adjacent to the Library’s second-level.





Campus Commons: View from Library Entry with Dining / Bistro to right and Campus Porch above



Campus Porch with Commons below / Academic Meeting Classrooms to the left



Terrace at Library Entry / Commons Porch

When it comes to spaces for informal social gathering and study, the modern campus library, student union, and dining hall all share remarkable similarities. Each building type promotes interaction and collaboration in a variety of settings, encourages students to meet, interact, and learn, all with access to technology—while being flexible, adaptable, and responsive to rapidly changing digital resources.





Library: Quiet Study Attic with mountain views on the Third Floor



Library: Entry and 24-Hour Zone off of Campus Commons



Library: Bay Window Study beneath Stair / Group Study



Late Night study in the Library 24-Hour Zone



Student Organizations: Activity Loft

Co-locating and cross-training library, campus life, and student development staff brings program synergy to life. This overlap translates into a more efficient building—with fewer spaces than if built separately—concentrating and amplifying the sense of activity around learning outside the classroom. In fact, the number of students using the library has increased by nearly 80% since opening.



Learning Spaces Collaboratory Roundtable
Spring 2016: Focusing on the Future of Planning Learning Spaces
Boston University

Driving Questions

1. How can we take better advantage of distributed, underutilized campus spaces?
2. How can we showcase STEM programs at work?
3. How can we make industry partnerships work to our advantage?
4. How can we attract the next generation of STEM students?
5. How can we plan for future flexibility while managing a limited budget?
6. How can a single space be shared among multiple stakeholders and program roles?

The Engineering Product Innovation Center (EPIC) is a new engineering curriculum that emphasizes a hands-on approach to product design and trains students in the process of bringing new products to the marketplace. The program consists of a reorganization of engineering and maker tool sets, assembly areas, classrooms, and research labs from disparate locations across Boston University's campus into 20,000 SF of revitalized storefront along Commonwealth Avenue. The goal of EPIC was to put the engineering experience front and center and enrollment in related engineering programs has soared since its opening in 2014.

The planning for EPIC occurred in several distinct steps. In 2010, a comprehensive space needs assessment for the College of Engineering (COE) identified available space. The site of the vacant Guitar Center storefront at 750 Commonwealth Ave was chosen for its prominent location, high volume of pedestrian traffic, and ease of vehicular and mass transit access.

A Basis of Design program was created that included consolidated machine tools, shared assembly areas, a materials testing lab, foundry, wood shop, and classrooms. Test fits and program efficiencies were developed to provide a clear understanding of both cost and space needs.

EPIC was born out necessity, but took on a life of its own. The COE proactively engaged local industries - such as GE Aviation and Procter & Gamble - to help defray renovation costs, retool the curriculum and provide students with relevant skills. EPIC is a pioneering facility that helps address a critical need in the US: the training of prospective engineers who understand how to develop and manufacture innovative new products.

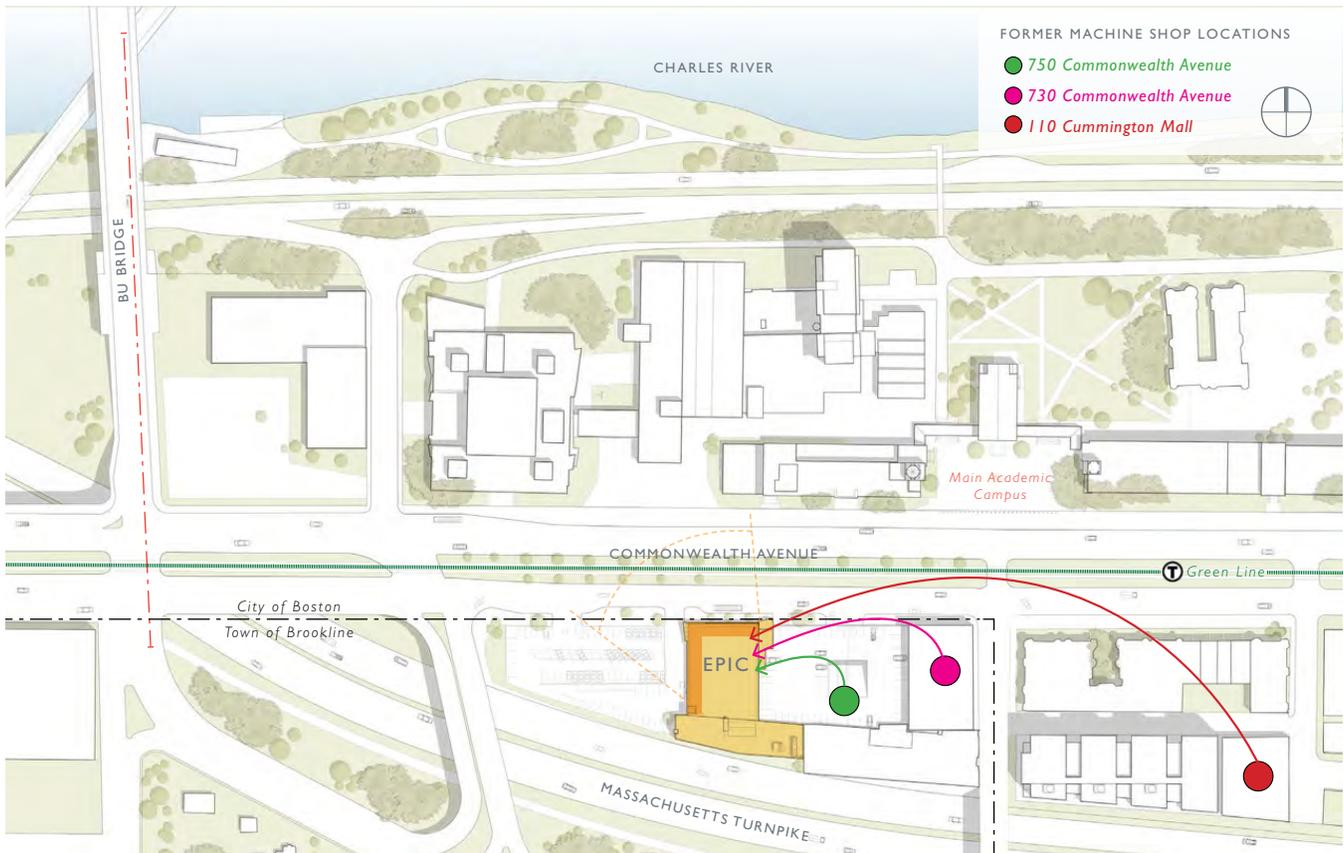
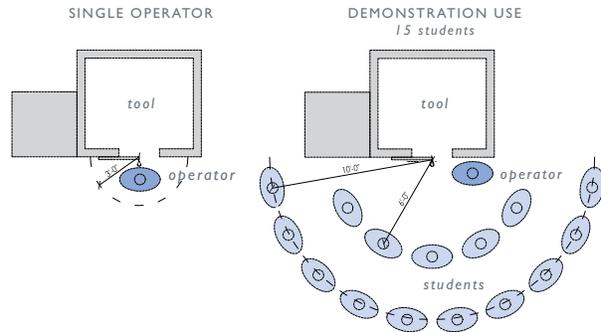
The COE's top priority - to bring Engineering to the forefront of BU's main campus - was realized. The design delivers EPIC as a prominent gateway to the central campus as students cross from west to east across the BU Bridge. EPIC is not only visible, but transparent; passersby see production and activity occurring within the open space. Since the facility opened, the level of student engagement and interest in EPIC has grown to accommodate 750 students per semester. Additionally, EPIC originally included 4,000 SF of shell space for research that has recently been fit-up for the BU Robotics Lab. The lab is a perfect partner for EPIC, promoting a hands-on research environment.



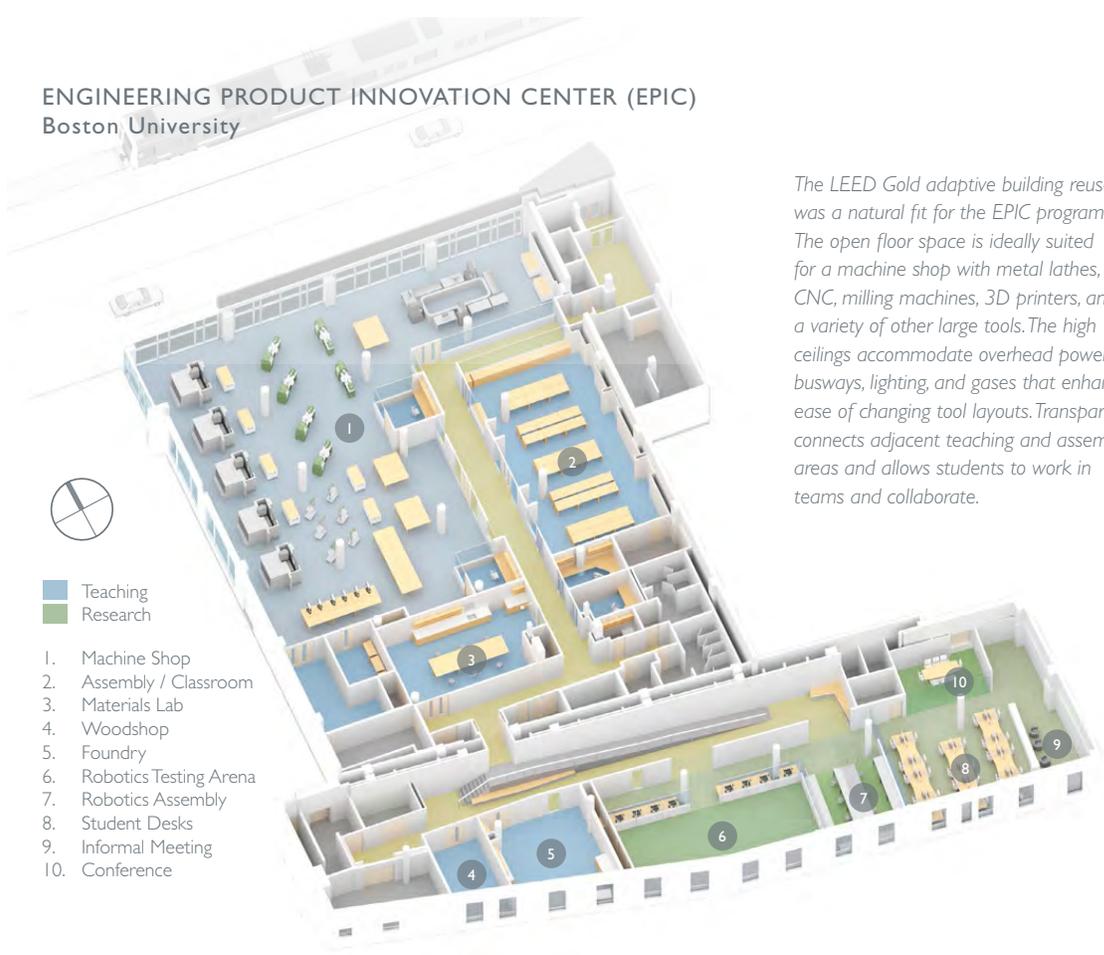


A large expanse of glass along Commonwealth Avenue puts the engineering program 'on display' and affords pedestrian traffic a view into the space. The once anonymous and obsolete building now serves as a gateway presence at the heart of BU's campus.

The existing ME teaching machine shops, as shown below, were located across three different campus buildings, and required dedicated staff for each location. By consolidating the shops into the EPIC facility, the COE was able to free up valuable space for faculty hires and realize an efficiency of ME teaching space. The tool layout in EPIC is optimized to allow for an efficient use of space for both single operator and demonstration use.



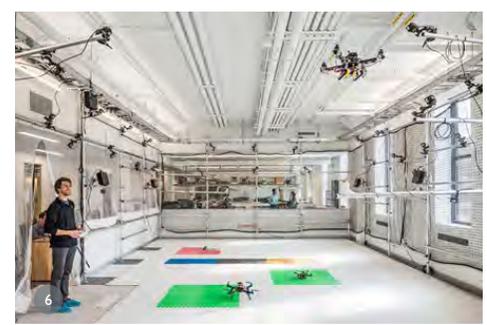
ENGINEERING PRODUCT INNOVATION CENTER (EPIC) Boston University



■ Teaching
■ Research

1. Machine Shop
2. Assembly / Classroom
3. Materials Lab
4. Woodshop
5. Foundry
6. Robotics Testing Arena
7. Robotics Assembly
8. Student Desks
9. Informal Meeting
10. Conference

The LEED Gold adaptive building reuse was a natural fit for the EPIC program. The open floor space is ideally suited for a machine shop with metal lathes, CNC, milling machines, 3D printers, and a variety of other large tools. The high ceilings accommodate overhead power busways, lighting, and gases that enhance ease of changing tool layouts. Transparency connects adjacent teaching and assembly areas and allows students to work in teams and collaborate.





Learning Spaces Collaboratory Roundtable
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 University of Washington

Driving Questions

1. How can the successes or failures of existing learning spaces be better understood and enhance future learning environment design efforts?
2. How can students actively participate and constructively contribute to the design of spaces in which they will learn?
3. What is the appropriate balance/blend of learning modes? How can content be delivered to optimize the knowledge capture for diverse learners?
4. How can the factor of time (utilization in and outside of formal classroom hours) be better incorporated into learning space design?
5. How are learning spaces contributing to a university's sustainability missions of teaching resourcefulness and reduced energy use?
6. What technologies allow students to gain an intensified awareness of diversity and culture?

Scheduled to open in January 2017, the Learning & Teaching Center will be the University of Maryland's first multi-purpose academic building to be constructed on the College Park campus in 50 years. Ayers Saint Gross guided the University's planning committee to program and design a dynamic, state-of-the-art facility that is architecturally significant and compatible with the historic nature of the campus, responds to the site, meets the technical and special requirements of the program, and will serve the University of Maryland learning community well into the 21st century. Three tenets drove the design, that:

- Learning happens everywhere, inside and outside of formal instructional spaces
- Formal and informal instructional spaces must be responsive to the needs of students as learners
- Openness and transparency is essential for shaping communities of learners.

One-third of all undergraduate students at UMD will attend classes in the Center every day. The facility is designed to support ~ 2000 students occupying classrooms (formal instructional spaces) at any one time, with a diversity of learning environments types and sizes.

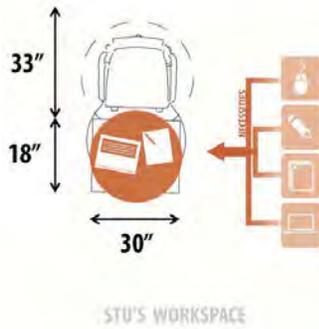
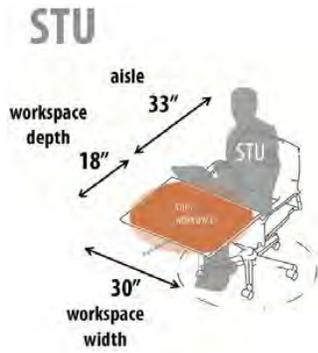
Formal learning environments are designed to accommodate a diverse range of pedagogical approaches to teaching and learning including collaborative learning in teaming modules of six students. The design enables problem-based learning to be integrated into every class. Technologies are infused throughout the spaces to accommodate traditional teaching methods as well as distance/blended learning technologies. Furniture in the classrooms will be mobile, durable and flexible, with a variety of heights, surfaces and amenities

Informal learning environments are designed to accommodate collaborative teaming sessions, with carefully acoustically designed spaces scattered throughout the Center. These informal spaces will also accommodate spontaneous faculty-to-student or peer-to-peer dialogue.

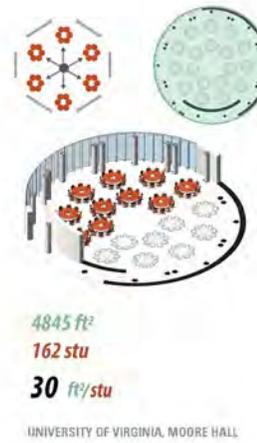
Instructional support space includes staff offices for the Center for Transformative Learning, as well as spaces for technologies in support of distance/blended learning.



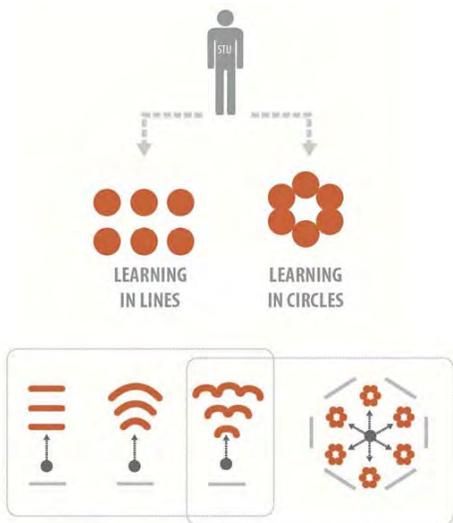
STUDENT-CENTERED ANALYSIS



PEER INSTITUTION AND PRECEDENT ANALYSIS MODELS

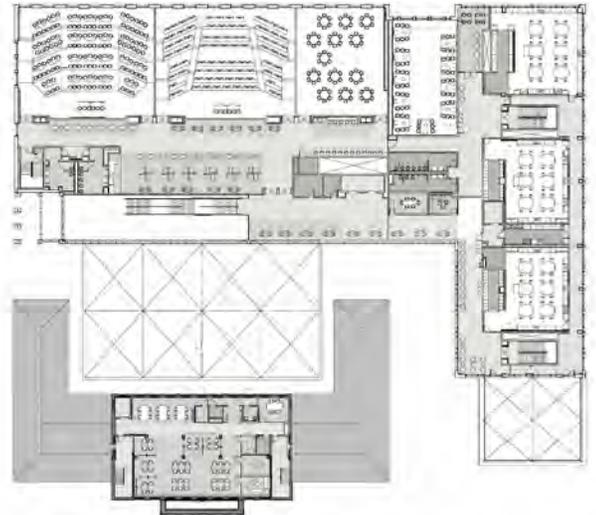
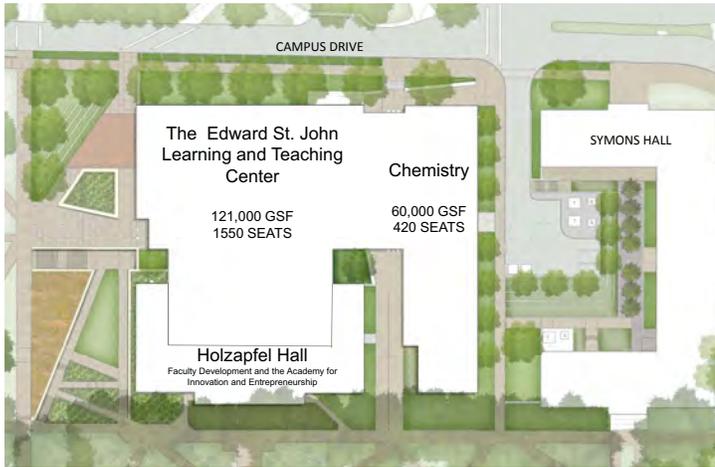


APPLICATION MODELS: ABSTRACT PEDAGOGICAL LAYOUTS

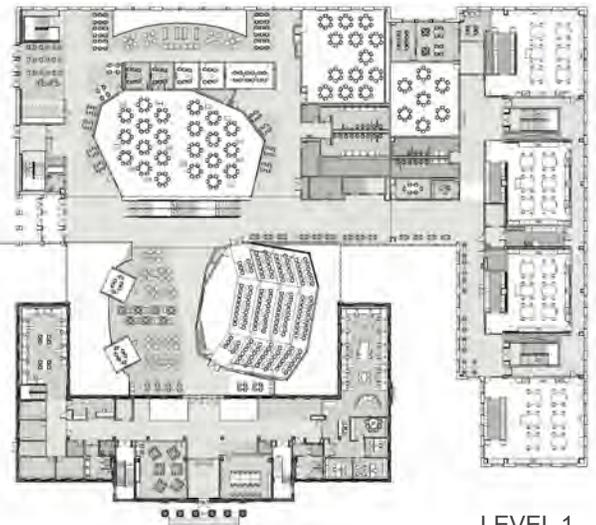
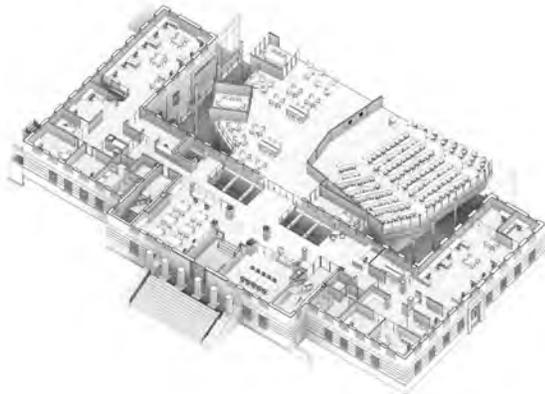


LEARNING SPACE CAPACITIES	TIERED COLLABORATIVE ROWS	TIERED COLLABORATIVE ELLIPSE	FLAT COLLABORATIVE CIRCLE	TOTAL PER CAPACITY
78			4	4
132			1	1
156	1	2		3
248	1			1
328	1			1
TOTAL PER TEAMING MODULE	3	2	5	10

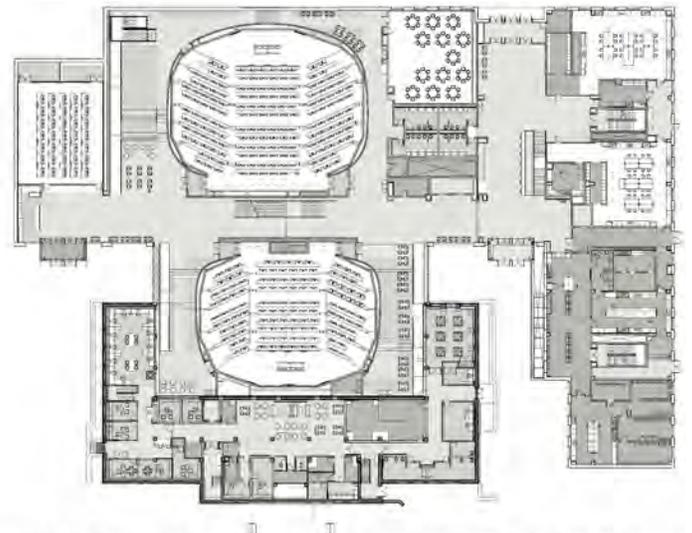




LEVEL 2



LEVEL 1



GROUND LEVEL



BORA



Learning Innovation Center (LiNC)
Oregon State University
Firm: Bora Architects
Firm Representative: Tom Bauer, AIA

Learning Spaces Collaboratory Roundtable
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University of Washington

Driving Questions

1. How can classrooms environments improve student and faculty retention and improve graduate rates?
2. What are the spatial characteristics that encourage active learning and are they scalable? Can such characteristics be applied to lecture halls? Can lecture halls be more than a necessary program element, and become an experience that faculty aspire to and students are attracted to?
3. Is the classroom building replacing the rec center as a primary recruiting tool? What is motivating institutional investment in effective teaching learning spaces--and how does a project fuel that initiative? What is the impact of housing a significant percentage of classroom seats under one roof?
4. How do we know whether new spaces for active learning are improving learning outcomes?
5. How do you inspire faculty to consider new teaching methods and spaces and equip them with the skills, confidence and excitement to embrace experimental teaching environments? What programming and design processes effectively maximize this consideration?
6. How do you leverage these progressive environments to inspire further change and progress?

Oregon State University's new 126,000 sf Learning Innovation Center showcases unprecedented classroom configurations that maximize engagement between students and faculty in classrooms seating from 16 to 600. The building houses 2300 seats for formal instruction. OSU laid out a clear directive for our team: to physically support the institution's efforts to raise graduation and retention rates through increased student and faculty engagement. We were also challenged to develop large classrooms for active learning. We led a deep exploration of possible classroom formats with faculty, using multiple pedagogy charrettes and full-scale mock-ups to test drive the unique spaces. We researched and defined the spatial characteristics that were essential for engagement in the classroom, including physical proximity and visibility between students and instructor, mobility and flexibility – many of the same factors that influence the actor/audience relationship found in theatre.

Based on this exploration and analysis, Bora designed a series of academic spaces including two in-the-round Arena Classrooms of 600 and 300 seats, and a Parliament Classroom of 175. The large Arena shrinks the distance between student and instructor to 35 feet, and four radial aisles extend from the central podium allowing faculty to come within 15 feet of every student. The small Arena reduces the maximum distance to 25 feet. These spaces offer wrap-around projection screens, and professors are untethered via wireless technology. They can roam throughout the classrooms to engage students directly, while the screens allow a broader variety of ideas, images, or presentations to appear simultaneously. Faculty receive training from the newly-created Integrated Learning Resources Center, located on the top floor. Space and staff are provided to test pedagogy, technology and equipment before it launches in the classroom.

A perimeter circulation loop wraps around the classrooms, adding 600 seats to the interior learning landscape and providing students with additional areas to study and socialize. Learning extends beyond classroom walls, and the LiNC is designed to support students and faculty interaction through the day and into the evening. By virtue of its versatility and diversity of spaces, the LiNC has become OSU's academic union.



Quantifying the impact of large scale active learning spaces

To study the effects of alternative large-scale classroom configurations on student learning outcomes and engagement, Bora has entered into a long-term partnership with OSU's College of Education, Center for Teaching and Learning, and Media Service's Teaching Across the Curriculum. Initial research created a baseline of student outcomes by studying large-scale classrooms in existing OSU facilities where instructors are attempting to use active learning techniques. Data about test scores, attendance, participation, and engagement is now being gathered on the same courses/instructors in LInC's new classrooms. More than 10,000 students have signed up to participate, and clicker technology tracks student attendance and seating location in the room. The data collected will inform future classrooms and teaching methods both on the OSU campus and at other higher education institutions



From Top: The heavily textured red brick façade connects to the color and material vocabulary of the registered historic campus core. Large windows create an occupiable facade revealing the life within the building.

600-seat Arena classroom: maximum distance from speaker to student is 35' (9 rows)

300-seat Arena Classroom: maximum distance from speaker to student is 25' (6 rows)

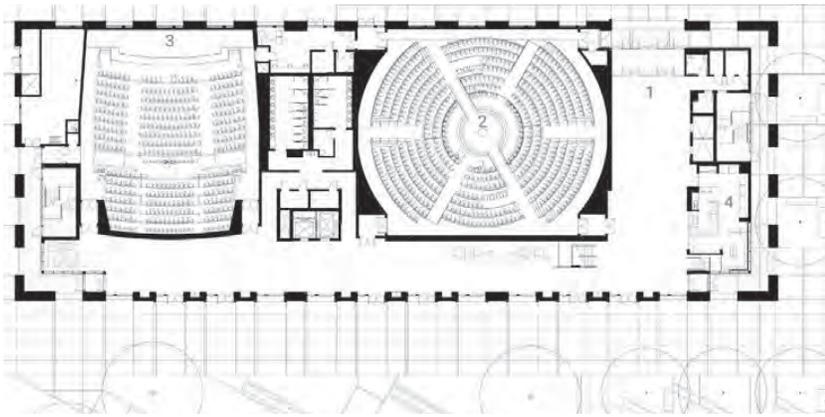
Top: 72-seat Learning Studio employs full technology of scale-up classroom pedagogy.

Mid/Bottom: The thick façade is occupied by students, providing a significant connection to the outdoors. The stairs are celebrated as social environments and the life of the building is presented to the campus beyond. The perimeter circulation loop creates a vibrant life outside the classrooms. More and less private study and group work areas are provided.



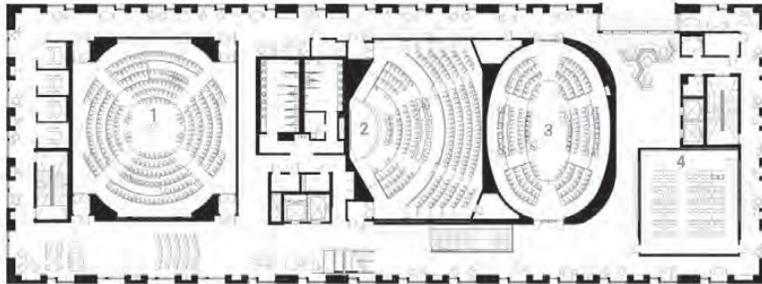
FIRST FLOOR PLAN

- 1 Main Entry
- 2 Large Arena Classroom
- 3 Lecture Hall
- 4 Market



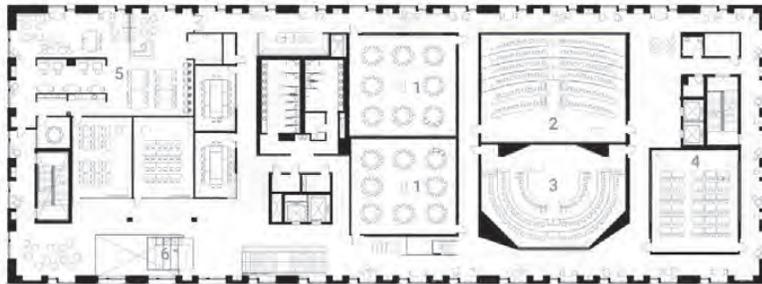
SECOND FLOOR PLAN

- 1 Small Arena Classroom
- 2 Fan Lecture Hall
- 3 Parliament Classroom
- 4 Flexible Flat Floor Classroom



THIRD FLOOR PLAN

- 1 Learning Studio
- 2 Tiered Breakout Classroom
- 3 Case Study Room
- 4 Flexible Flat Floor Classroom
- 5 Honors College Computer Lab
- 6 Forum



FOURTH FLOOR PLAN

- 1 Offices
- 2 Faculty Lounge
- 3 Honors College Offices
- 4 Integrated Learning Resource Center



SPATIAL CRITERIA

Visibility

- To Faculty
- To Media
- To Peers

Proximity

- Eye Contact
- Facial Expression
- Shared Work Surface

Mobility

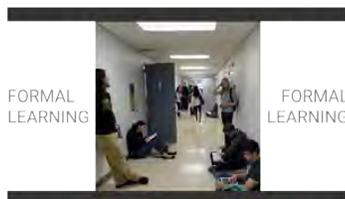
- Of Faculty
- Of Students
- Of Media

Flexibility

- Furniture
- Space
- Over Time

We developed a clear set of spatial criteria to guide an extensive investigation into what makes an active learning space. These criteria were used to test and guide design of the broad range of classrooms throughout the building.

TYPICAL CLASSROOM LAYOUT

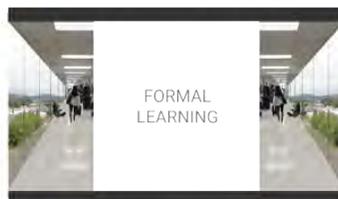


FORMAL LEARNING

FORMAL LEARNING

TYPICAL CORRIDOR

OSU CLASSROOM BUILDING CONCEPT



FORMAL LEARNING

INFORMAL

INFORMAL

Classrooms are pulled off of the exterior wall to provide a daylight circulation loop that is a rich and varied zone for over 600 seats for informal learning. Controlled daylight and views are provided to the classrooms and their heating load is reduced to zero.





Odegaard Undergraduate Library
University of Washington
Firm: Miller Hull
Firm Representative: Ruth Baleiko, AIA

Learning Spaces Collaboratory Roundtable
Spring 2016: Focusing on the Future of Planning Learning Spaces
University of Washington

Driving Questions

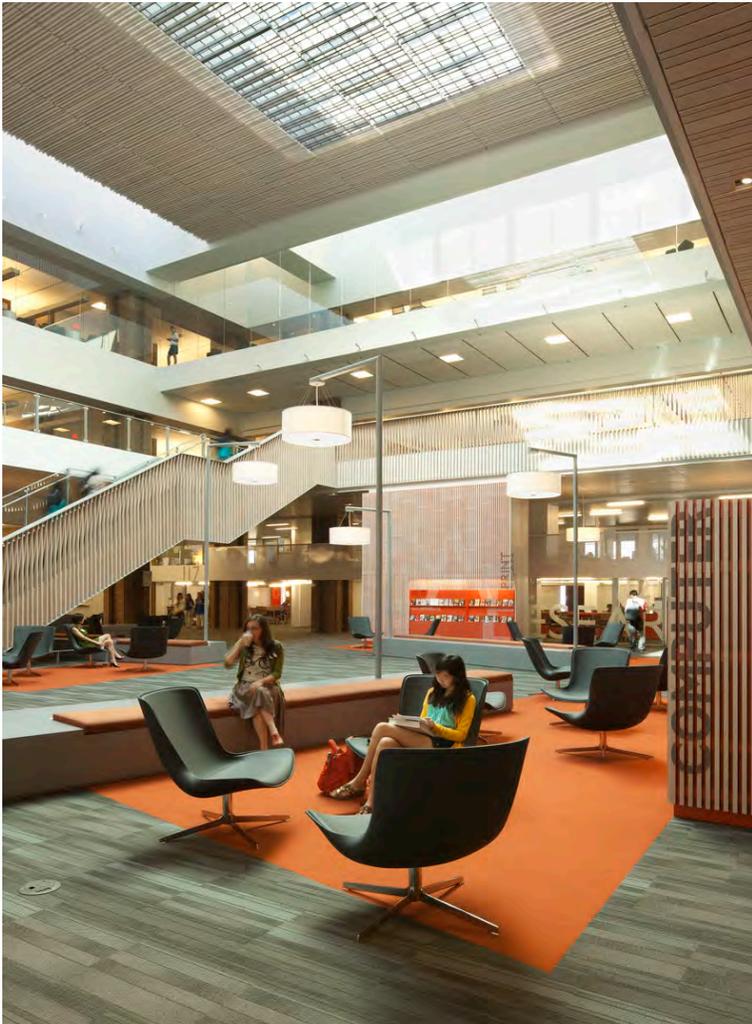
1. How can we create “the students’ office on campus,” which provides all the resources they need to pursue their educational interests?
2. What strategies can we use to make library resources more approachable, explorable and transparent to students?
3. What learning activities are most relevant to our users and how can they be fostered through the design of space?
4. For a university with many buildings and classroom types, what should the next leap in active learning classrooms look like?
5. How can we shorten the University’s capital projects typical process from 45+ mos to 22 mos max to satisfy legislative funding requirements, while maintaining inclusive stakeholder input and creative design solutions?

In the fall of 2011, the University of Washington hired the Miller Hull Partnership to undertake a significant renovation to the 1972 Odegaard Library. The team was tasked with creating “the students’ office on campus,” with active teaching and learning a vital part of the program. A core group of library faculty, staff, teaching and learning experts, and architects identified a series of learning activities that would be most vital, and then designed a series of architectural solutions that specifically addressed each one. As a whole, they came to define the new interior of the library and created newfound student space and resources. The project has received several AIA awards, including a National AIA Design Award for the thoughtful transformation of a campus landmark.

In addition to developing these learner-centered experiences, the team was required to master plan, design, construct and re-occupy the facility within 22 months (in order to satisfy legislative criteria); while keeping the facility open 24/5. In the spirit of collaborative learning, the University, architect and contractor created a nimble and integrated way of working to deliver the project under these constraints. Odegaard has received national awards for creative and high performance project delivery.

Today, the library serves nearly 10,000 students a day around the clock. Spaces were designed as scheduled classrooms by day, and become student-owned study space by night. A co-located research and writing center brings together graduate student writing tutors with Library research faculty and staff. Faculty from dozens of departments now sign up to use the hi-tech active learning classrooms; and the University is building out the next leap in active learning classrooms, based on continuing assessment data from Odegaard.





Existing atrium reimagined as 'heart' of the building



Inefficient, outmoded 1970's era building was unable to keep pace with shifts in learning, technology, and energy use



Alcoves provide space for individuals or small groups



Active Learning Classrooms support collaborative, tech-savvy team learning



New large skylight adds both light and 'airiness' to three story atrium



Remodel of imposing atrium stair revealed 6500 SF of 'found' study, gathering space



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Driving Questions

1. How do contextual considerations influence the planning of learning spaces?
2. How do you assemble a collection of learning spaces that embrace multiple visions of the community about how and where learning happens?
3. How can attention to the characteristics of an ideal learning space influence the process of planning?
4. What metaphors can be used to push-the-envelope in thinking about what spaces can be, can do?
5. How do you anticipate what tomorrow will be like as planning happens today?

Outcomes: Learning happens everywhere, in many ways, all the time. Every space is a learning space:

- Make spaces that are welcoming, easy to find and use
- Make spaces that are comfortable and desirable to inhabit
- Allow for places to experiment with new modes to provide and consume information and material
- Create environments that foster interaction and collaboration.
- Engage students with places that they can take ownership over.

A sense of place: The design is inspired by the natural landscape and local timber industries of Gray Harbor. Historically, loggers would use the flow of the nearby Chehalis River to transport logs from the forest to the sawmill. The design of the site draws influence from the jumbled, chaotic logjams that would develop. Attention to the history of timber also influenced the interior architecture finishes of natural materials and textures.

Program: The project was conceived in master plan and predesign phases as a new place for Science, Math and Art – and referred to as the SMArt building. It then mixed in additional focus on the STEM fields of Technology and Engineering and the resultant was a new STEAM facility.

Site planning: The design also fulfills the vision of the campus master plan, which calls for a future hilltop green organized around an axis that connects to views across the Chehalis River. Rotating from a north/south orientation due to the hillside behind this site, the building also defines this spot as a bookend to the south and faces the campus gateway at the north.

Building concept: 4 story tower holds faculty office plus laboratory and studio spaces. It overlaps or interlocks with a podium – which is a partial basement engaging the hillside. The collection of spaces in the podium are a hub of flexible interaction and common learning activity. These classrooms are arranged as “rocks in a stream” and the circulation implies movement and activity around and between these solids.

Issues considered in development of learning environments: Educational systems over time have generally become teacher centered environments where students go for instruction. A current and future model is toward learner-centered environments where students engage in learning. An engaged learning experience is social as well as academic. It is interactive and experimental and allows for expanded styles of learning. Learning can be auditory, visual, kinesthetic and experiential. (Hear, See, Do) How would an ideal learning environment support this? What to students and faculty expect to learn and teach? What stimulates intellectual and social growth? What fosters interdisciplinary interaction and collaboration? How can a spirit of learning (lifelong) be nurtured? What are trends for the future?





A Place of Comfort: A central commons of shared experience & activity.



Honor Outdoor Learning: Inside connected to useful outdoor gathering spaces.



Sense of History: Natural materials & textures, including exposed, textured concrete wall, wood ceilings & reclaimed timber beams.

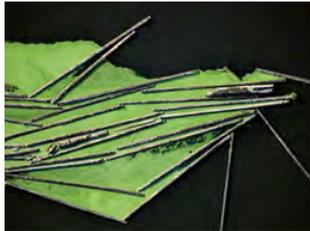


Respect the Individual: Places of refuge for personal reflection.

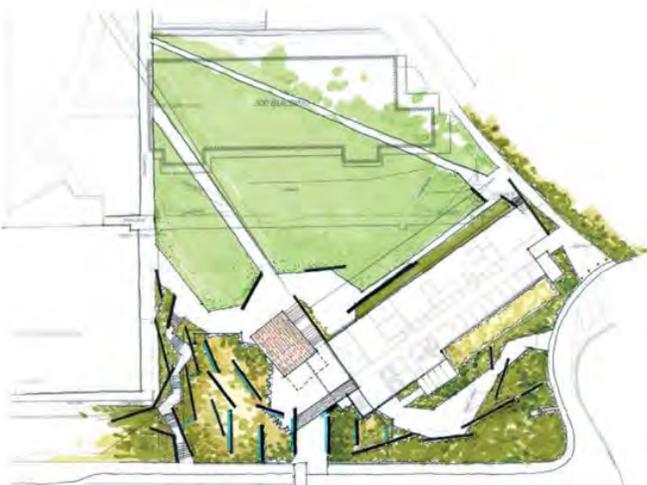


Accommodate Group Sharing: Functional for small groups over larger.





Be Unique: Attract users with something unexpected.



Connected to Campus: Consider adjacency to nearby facilities & resources.



Show Others What is Going On: Put program activity on display to all.



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Driving Questions

1. How would the design of these classrooms accommodate the flexibility needed to potentially fulfill use within two pedagogical models?
2. How could their flexibility of design be used to leverage the potential wholesale adoption in the future of just one of those models?
3. How could the classroom's design allow both enough specificity and enough flexibility to serve as either general-use classrooms or learning lab spaces?
4. How will adjacencies support learning?
5. How will furniture be used to work in conjunction with technology to support facile transitions between modes of learning?
6. How do we design spaces that not only support but suggest different modes of collaboration?

The University of Washington Nano Engineering and Sciences Building, under construction, is Phase II of and a large addition to the adjacent UW Molecular Engineering and Sciences Building, completed in 2012. UW Nano, like the Phase I UW Molecular, features four stories above grade and one story below. Floors two through four of UW Nano are programmed research laboratory spaces, the same as all five floors of Molecular; however, two active learning classrooms, one large and one small, and those classrooms' auxiliary break-out space comprise the first floor of UW Nano and will be discussed here. These three spaces work together to advance the "flipped classroom," i.e. one in which content is not delivered in the classroom and then absorbed as individuals thereafter, but one in which content is procured before the classroom visit, developed with teammates and professors in the classroom, and then developed further with other students after the classroom session.

The design of these two new classrooms and auxiliary space follows a period of contemplation and decision-making, a period of flux: First, the university's initial decision to create two general-use classrooms followed on the heels of a campus-wide classroom space study conducted by ZGF in 2011. Then, the feasibility of allocating general-use classrooms within this research facility fell under question, and a series of conversations with many campus stakeholders ensued, assessing the following:

What do these two classrooms truly need to be, and how do they need to serve and facilitate learning? That question was posed within a milieu of pedagogical uncertainty. Some faculty members sought to retain the structure and dynamic of older pedagogical models while other faculty sought to adopt the more progressive, active learning model. How would the design of these classrooms accommodate the flexibility needed to potentially fulfill use simultaneously within both pedagogical models? How could their flexibility of design be used to leverage the potential wholesale adoption in the future of just one of those models? How could the classrooms be designed to allow for both enough specificity and enough flexibility to serve as either general-use classrooms or learning lab spaces? Not only were the end-user audiences undetermined, but the very conventions of classroom function, and how they enabled the relationships inherent to learning, were also in debate.



Ultimately, the solution to these dilemma came in the form of two classrooms, one small and one large, plus an adjacent large break-out space. The large break-out space—a third place—not only supports but suggests different modes of collaboration from large group to heads down, focused alone time. The large classroom will accommodate about 60 students in an active learning configuration; the small classroom about 35. Because the furniture is not fixed, the large classroom can also be reconfigured to provide a seminar setting of around 90 seats.

A broad premise behind their design: A shift away from the monumental assignation of furniture and technology to an adaptable consideration of both. Because technology changes faster than conventions of furniture or building design, here, tables designed with half-hexagonal tabletops can be, for instance, brought two together (to the shape of a stop sign), or positioned linearly, one shifted 180 degrees after the next, to form a seamless row of table surface. The half-hexagonal tabletop shape became a formal expression of flexibility. It works better than circular or rectangular tabletops to bring people together in parity, with equal sight and auditory access, because of the seamless way the tables combine to easily facilitate larger or smaller groups. Also, all of the large classroom’s walls are writable surfaces; two large projection screens offer a strong focal point when that focus is required; and several short-throw projectors provide ample opportunities for students to quickly display their work for discussion among groups of various sizes and configurations at the semi-hexagonal tables.

Conversely, the small classroom’s assignation shifted from general classroom to science classroom to, most recently, a classroom that will serve as a teaching lab for research in sustainable technologies. The moving target nature of the space’s function coincided with the earlier uncertainty as to its pedagogical model. Now the space will feature a combination of rectangular tables, lab benches, hoods, various equipment, storage, and access to data to support STEM-based investigations and problem solving



	400 SF	700 SF	1700 SF	2,300 SF	3,000 SF
LECTURE	22/sf 18 seats 	19/sf 36 seats 	16/sf 105 seats 	20/sf 110 seats 	20/sf 140 seats
INTERACTIVE	30/sf 13 seats 	20/sf 34 seats 	28/sf 60 seats 	33/sf 68 seats 	29/sf 100 seats
DINNER THEATER		22/sf 32 seats 	38/sf 44 seats 	30/sf 75 seats 	29/sf 100 seats
ACTIVE		29/sf 24 seats 	30/sf 50 seats 	28/sf 80 seats 	30/sf 90 seats
FLEXIBLE	33/sf 12 seats 	35/sf 20 seats 	42/sf 40 seats 	38/sf 60 seats 	32/sf 90 seats

10-15 ASF/SEAT: LARGE LECTURE CLASSROOM
 20-25 ASF/SEAT: TYPICAL FLAT FLOOR CLASSROOM
 30-40 ASF/SEAT: ACTIVE LEARNING CLASSROOM

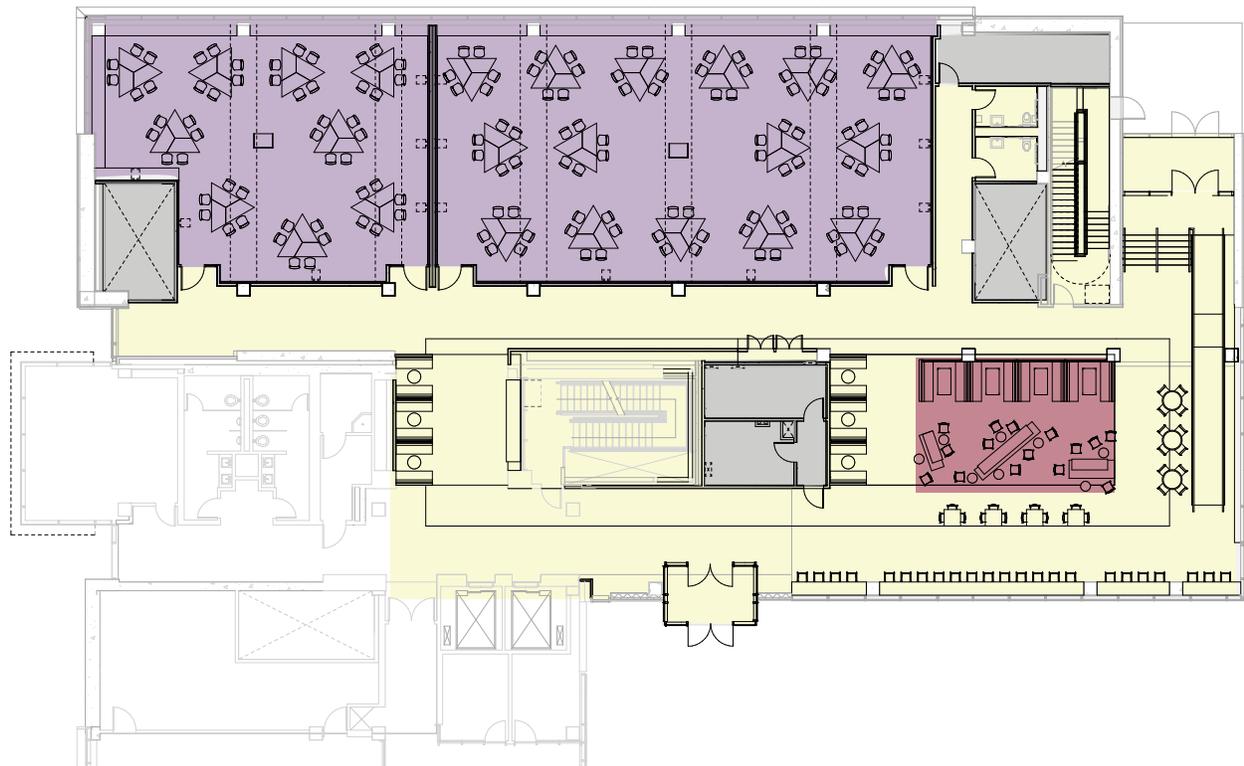
A period of uncertainty and indecision in terms of pedagogical and programmatic goals preceded the development of the classrooms at the University of Washington Nano Engineering Building. These diagrams presented options for forethought, discussion, and decision-making.



Importantly, the third space on UW Nano's first floor is a shared, informal learning center that fulfills students' needs both before and after classroom sessions. The furniture in this large space suggests different group configurations. From booths that can be made larger or smaller, to tables for two, to a bar along a glass wall with individual seating for heads-down, focused individual learning—the space provides opportunities to prepare and/or continue to develop the ideas shared and advanced in the classroom. The adjacencies of classrooms to this large space enhance the classroom experience to encourage the continuation of problem-solving immediately after the classroom session.



Problem solving continues outside and along the stairs



Level 1 of the building features a large classroom, a small classroom and a break-out space. Here the classroom furniture arrangement features the semi-hexagonal tables specified for this facility. Amenable to small groups of two or as show here, three, the tables can also be flipped 180-degrees from one to the next to create a seamless, linear configuration of table surface.



Learning Spaces Collaboratory Roundtable
Spring 2016: Focusing on the Future of Planning Learning Spaces
Loyola Marymount University**Driving Questions**

1. What can the design of the building do to promote interdisciplinary interaction and de-Balkanize departmental tendencies?
2. What is the importance of “Science on Display” and how does it support more open learning environments?
3. How can design challenge pre-conceived notions of undergraduate teaching laboratory design? How do you get buy-in from faculty for more open environments?
4. How do you balance the need for low-tech vs. high-tech interaction spaces? And, where should these spaces be located within a building?
5. What is the importance of exterior learning environments? Can your project create spaces for the entire campus community to enjoy?
6. How do you engage faculty and student from across campus and create environments for cross-departmental interaction?

Located on the Los Angeles campus of Loyola Marymount University, the new, 98,500-SF Life Sciences Building and 110,000-SF below-grade parking structure serve an undergraduate campus of 9,295 students. The LEED Gold-certified complex, completed and occupied in the Fall of 2015, has become a campus destination. As the first new building for the Seaver College of Science & Engineering in many decades, this high-profile STEM facility not only establishes new standards for undergraduate science education, but contributes to the establishment of new building and site standards for the entire LMU campus. LMU sought to create a nationally recognized, state-of-the-art undergraduate science center in which the learning and discovery is interdisciplinary and collaborative. Programmatic planning was organized around areas of focus, not disciplines, to foster a culture of collaboration. The building itself was to be a teaching tool and beacon for sustainable practices. It would place “science on display” and become an active participant in the education of the whole person. The resulting complex holistically integrates all these elements. Located near the Pacific Ocean with a year-round temperate climate, the project harnesses and embodies the Southern California lifestyle, taking advantage of the connection to nature and the indoor-outdoor relationship. The mission to break down departmental barriers and bring people together inside and outside the laboratories by providing open, light-filled public meeting spaces, large glass walls separating corridors and the laboratories, and the promotion of “science on display” to allow clear lines of vision onto the important work being conducted within. Departmental boundaries are blurred through the placement of programmed spaces. The LMU campus is green, bucolic, and filled with student-oriented recreation spaces. The Life Sciences Building maintains this vision through an assembly of courtyards connected by pedestrian-oriented walks and allees. It is sited on an existing parking lot, and it replaces and augments the lost parking spaces with a three-story, belowgrade parking structure. The design provides for a central courtyard with adjacent Seaver Hall. The notion of the courtyard is extended up the building via a planted roof that connects all three floors. Despite having 110 fume hoods, the building boasts a LEED Gold rating. The green roof promotes a healthy lifestyle and filters rain water, while serving as a vehicle for student-led research. The photovoltaic array defines a gateway entry, shades exterior spaces, and protects glazing while providing 10% of the building’s energy. Chilled beams, displacement ventilation and natural ventilation increase thermal comfort while reducing energy demands.







Learning Spaces Collaboratory Roundtable
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 Loyola Marymount University

Driving Questions

1. How do we activate a 50-year old library of libraries that has technical and planning challenges into an active learning center?
2. Can a building with multiple additions and program uses be made legible? How do we keep 6,000,000 volumes of books accessible and provide new learning venues?
3. Can a 400,000 sq. ft. renovation be completed while maintaining current building operations and services?
4. How do we provide integrated learning opportunities? How do we activate “signature spaces” that focus on user experience? How do we create group learning spaces that promote group interaction yet allow for individual study? How can we create intimate study spaces within a large central library?
5. How do we make rare books celebrated, accessible, and integrated into learning?

Firestone Library has been the academic heart of Princeton University since its completion in 1948. As the last Collegiate Gothic building on campus. The massive 400,000 SF library—which reflected state-of-the-art flexible planning and open-stack design when built—is being completely remodeled by FFP as designer in partnership with Shepley Bulfinch (SBRA) as executive architect. FFP created an aesthetic that both preserved history and created a 21st century research environment with greater transparency and connectivity.

Design Framework / Project Drivers:

- Develop a strategy to increase legibility and transparency to encourage collaboration
- Create a wide range of learning and study spaces for multiple user groups
- Create a sense of place within the stack area
- Bring multiple user groups back into the building
- Make the rare book collection accessible

Signature spaces are strategically renovated to preserve the integrity of the original building while most of the library was transformed into a much more transparent, light, open environment. Mechanical and electrical systems and operations needed substantial replacement to achieve contemporary performance and sustainability standards. A key concept to the renovation is the notion of “domesticity”. Firestone is a “library of libraries”, personal collections given to the University over time. The new design creates areas of intimacy, warmth, and comfort. Vast stack areas are relieved by small, living room like reading “oases”, a planning device derived from the original design. Moderne interiors that meet contemporary ergonomics, study patterns, and sustainability standards. FFP worked with Princeton, SBRA and the builder to compress the schedule by several years, achieving substantial budget savings. An array of sustainable strategies target LEED Gold.

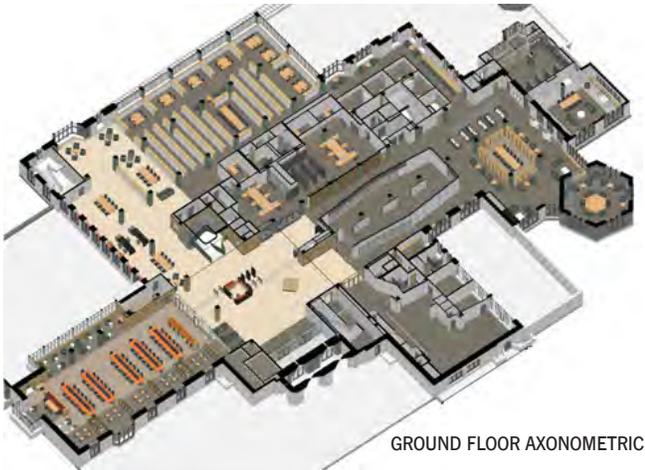


Princeton Firestone Library

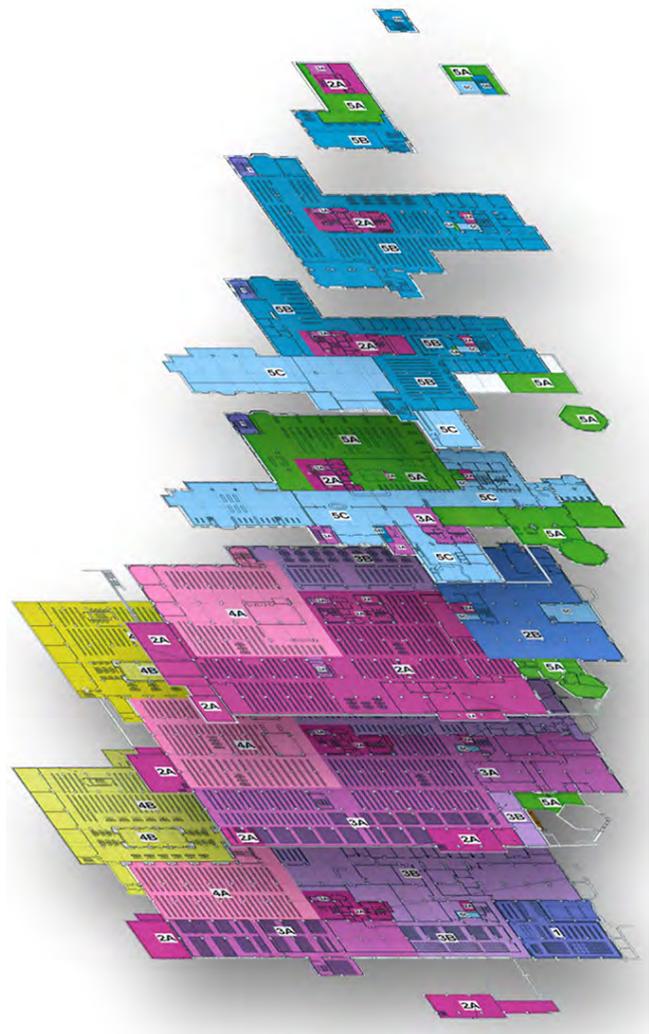




FIRESTONE PROPOSED NEW LOBBY



GROUND FLOOR AXONOMETRIC

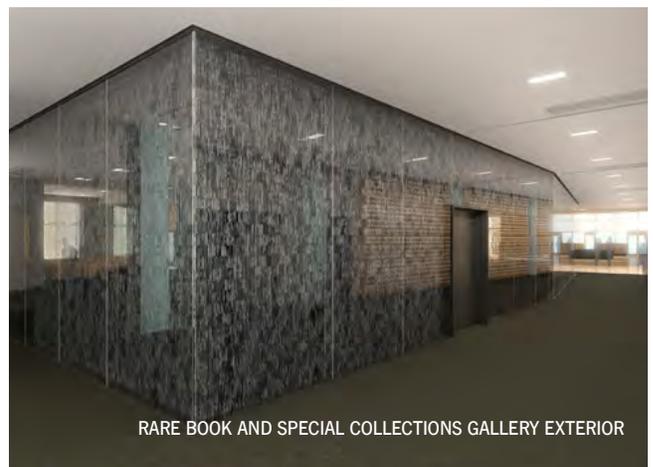




READING ROOM WITH COMMISSIONED TAPESTRY BY JOHN NAVA



GROUP AND INDIVIDUAL LEARNING



RARE BOOK AND SPECIAL COLLECTIONS GALLERY EXTERIOR



TRUSTEE READING ROOM



Learning Spaces Collaboratory Roundtable
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Loyola Marymount University

Driving Questions

1. Collaborative environments are as much a result of a collaborative programming and design process as they are the architectural response.
2. How do we better integrate our clients and their community into the design process?
3. How do we find synergies in program and systems to balance building efficiency with the growing need for communal/collaborative space?
4. How do we create communal campus activity at the ground floor of building and program types that require increasing amounts of security?
5. How do our projects contribute to the evolution of university programming by challenging traditional paradigms without alienating building users?
6. How does our connection to the natural environment inform programming needs and adjacencies?

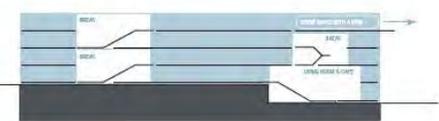
The Georgia Institute of Technology's new Engineered Biosystems Building (EBB) is a six-story, 218,000-square-foot research facility. The design for EBB reconceptualizes laboratory design, creating an interdisciplinary environment that supports the acceleration of advanced research development. EBB brings together chemists, engineers, biologists and computational scientists to foster interdisciplinary collaboration in research neighborhoods designed around targeted focuses. Encouraging active engagement and collaboration amongst researchers of varying disciplines was a core driver in the research facility's design.

Challenging the traditional laboratory design, typically composed of small silos of individual research teams, EBB creates a system of open-lab neighborhoods that foster engagement. The building is organized into a series of layers which include research and research support labs, a linear equipment corridor, open graduate student offices, closed post-doctoral offices, collaboration and teaching spaces, and a researcher office wing. Open office clusters are situated with a direct line of sight for research assistants to see into the lab from their write-up area.

EBB's interactive and open-lab environment is enhanced by transparency and an ease of collaboration that extends to two-story break-area spaces which bookend the building on alternating floors. This design move ultimately encourages those who have breakrooms on their own floor to move not only laterally, but also vertically throughout the building. This circulation pattern allows for serendipitous interdisciplinary interactions which may not otherwise occur if researchers had all amenities

in their home neighborhood. Spaces that require privacy remain in thoughtful proximity to the lab neighborhoods, and where needed, glass partitions interrupt open space to provide privacy between the graduate student offices and open-lab spaces. The building café creates an additional place for researchers to gather and congregate amongst each other and with researchers from neighboring buildings.





COMMUNITY

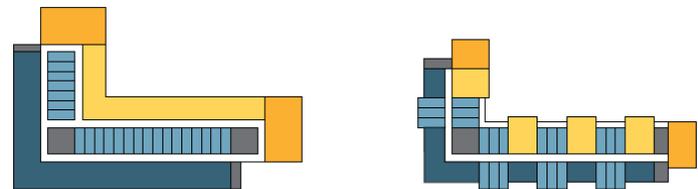
Create a living room that connects the research community with the campus community at a major pedestrian entry into campus.

RESEARCH NEIGHBORHOODS

The building is an collaborative network in which shared communal spaces and visual connectivity enable interaction between experts in a wide range of studies.

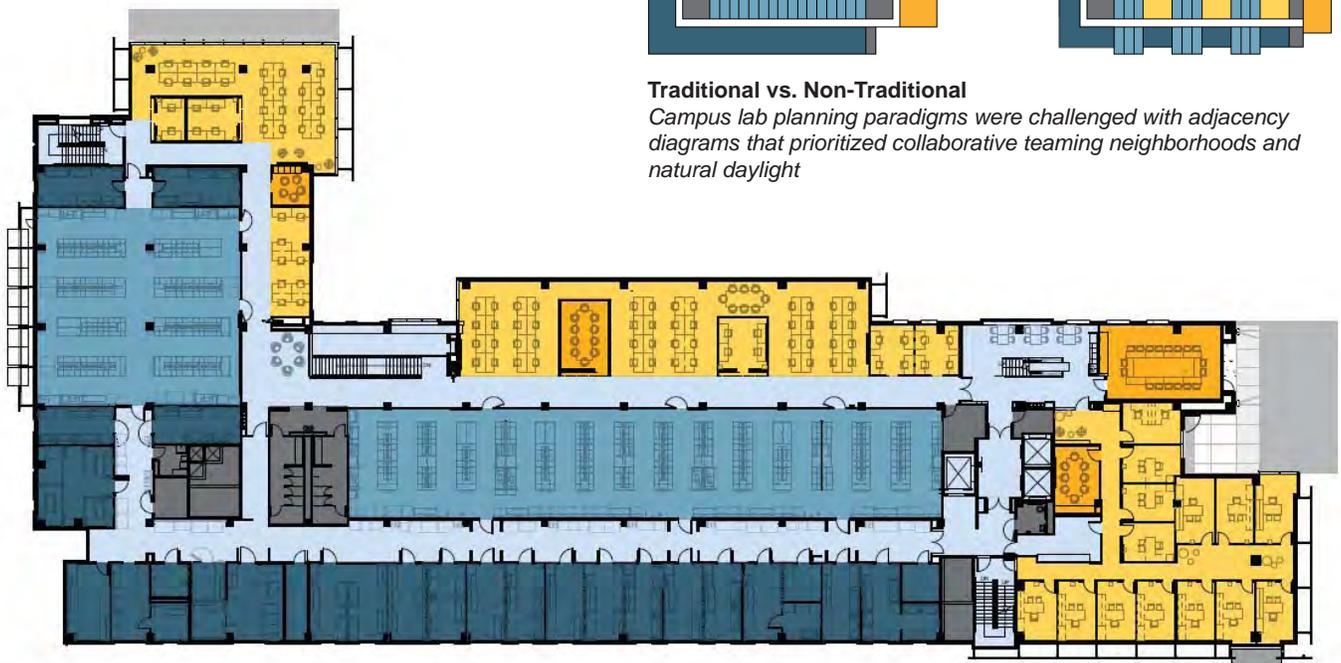
SECTIONAL CONNECTIVITY

Two story communal break rooms, stairs, and breakout spaces are distributed through the building to encourage interaction between levels. Quality daylight, warm tactile materials, circulation, and lounging furniture activate the space.



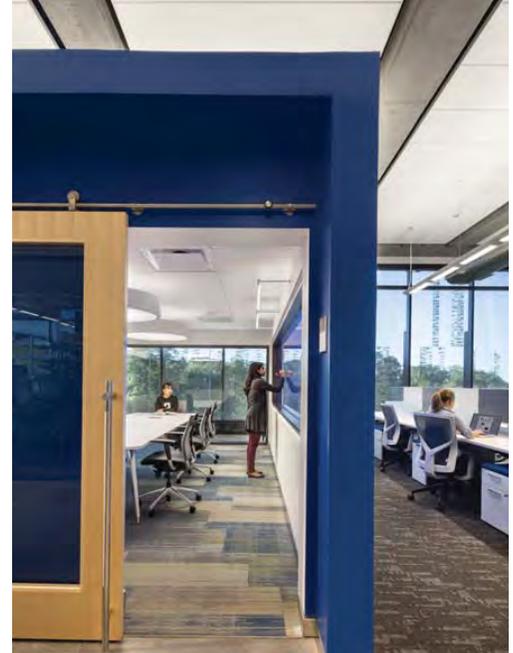
Traditional vs. Non-Traditional

Campus lab planning paradigms were challenged with adjacency diagrams that prioritized collaborative teaming neighborhoods and natural daylight





Even with a single loaded narrow footprint, EBB was able to maintain a 63% building efficiency by rightsizing and leveraging assignable breakout space to create two story living rooms at the intersection of programmatic neighborhoods and vertical circulation. These spaces benefit from an increased emphasis on materiality, volume, daylight, lighting, vending, and furnishings to become neighborhood amenities that are both visually and physically connected to the environment.



Visual connectivity is a key attribute of the collaborative environment and was a focus of the design team. We also wanted the users to have a view to the exterior no matter what space they were using throughout the day (Desk, Lab, Lab Support). Providing enclosed shared work space created magnets for activity while also managing neighborhood scales so that they begin to have individual identities.





Learning Spaces Collaboratory Roundtable
Spring 2016: Focusing on the Future of Planning Learning Spaces
Loyola Marymount University

Driving Questions

1. How can the proposed STEM Facility help attract and retain new students (both majors and non-majors)?
2. Given insufficient financial resources to replace all science facilities on campus as part of this project, which programs/spaces should be prioritized for the new building?
3. How can the planning process help engage all disciplines in developing a common vision and top priorities for the project?
4. What features should be incorporated into the new facility to foster an active and collaborative learning environment?
5. How can the facility design support future changes in personnel, pedagogy, technology and equipment over the life of the building?
6. How can the design of instructional laboratories promote flexibility and facilitate active learning pedagogies?



In 2011, the University engaged the design team to work with the Building Committee to establish the project vision and priorities. During a visioning session in early 2012, the participants noted the following goals:

- Modern, safe, flexible environment for student learning in which experimental, theoretical and computational learning modes are supported.
- Develop a facility that works now and 50 years into the future.
- Provide appropriate spaces for collaborative learning outside the laboratories and classrooms.
- Facility should have a positive impact as an ‘anchor’ building and serve as a reference point on campus.
- Incorporate ‘science on display’ to enhance recruitment and retention of students (majors and non-majors).
- Design should facilitate efficient servicing of laboratories from common preparation rooms.

One of the big initial decisions was to focus the new facility on first and second year STEM courses which would impact the greatest number of students. Relocating those courses into the new building would provide release space in the existing buildings to enhance the upper division courses and provided expanded faculty/student research space.

The design team conducted iterative, participatory work sessions to develop the ultimate solution which provides 32 technology-enabled lower division laboratories for Biology, Chemistry, Physics & Astronomy, Computer Science and Mathematics. The laboratories and building infrastructure were designed on a modular basis for both initial flexibility and long-term adaptability to support change over the life of the building.

Importantly, the facility also incorporates a variety of informal collaboration spaces including a central 3-story atrium, open and enclosed student study areas of different sizes for individual and group learning. These spaces incorporate movable furniture, large displays, writable walls, and places to hang student posters to facilitate peer learning.

The facility provides a great deal of external and internal transparency to support the ‘science on display’ initiatives, allowing students and visitors to see others doing science, and serve as a highlight of admissions tours on campus.



Level One of the Enzi STEM Facility features grade level access to the Science Commons which serves as the heart of the facility. A range of study rooms and alcoves with a variety of furniture styles provides options for study, peer learning and collaboration. This floor accommodates two 24-station Physics & Astronomy teaching laboratories, served from a central Physics Prep Room, along with a 56-station Shared Sciences teaching laboratory. There are also multiple computer laboratory/classrooms, lab coordinator offices, conference room and break room serving the occupants on this floor and throughout the building. The Science Commons can accommodate a variety of functions from small group collaborations among science students to larger functions such as the building dedication ceremony or other activities serving the needs of the entire University of Wyoming campus community.



Level One Floor Plan

The second floor of the facility accommodates six 24-station and one 40-station Life Sciences teaching laboratories with movable student tables fed with power/data from overhead service carriers. This arrangement provides flexibility for reconfiguration to support different teaching styles from day-to-day or term-to-term. The laboratories are serviced from a central Prep Room and two satellite Prep Rooms allowing for efficient laboratory preparation through a 'ghost corridor' at the back of the laboratory zone to minimize interference with student traffic in the corridor during class changes. This floor also features four computer laboratories with a range of capacities and furniture styles. The corridors have built-in padded benches for students awaiting the start of class, as well as an array of study carrells, group study rooms and alcoves to support the active and collaborative learning environment.



Level Two Floor Plan

The top floor of the Enzi STEM Facility houses the most fume-hood and ventilation intensive spaces, including six 24-station General Chemistry teaching laboratories and three 16-station Organic Chemistry teaching laboratories. The General Chemistry laboratories are served from a central Chemistry Prep Room along 'ghost corridors' at the back of the laboratory zone. One of the General Chemistry laboratories is also used to teach Quantitative Chemistry with an adjacent Instrument Room. The Organic Chemistry cluster features a central Prep Room, two Instrument Rooms and two Data Analysis Rooms. This floor also houses two Computer Laboratories, lab coordinator offices and a range of individual and group study rooms and alcoves. The central open stairway and corridor views into the atrium contribute to the sense of openness and transparency in this collaborative learning environment.



Level Three Floor Plan

COLOR LEGEND
 ■ TEACHING LAB AREA ■ LAB SUPPORT AREA ■ CLASSROOM / OFFICE ■ CORRIDOR ■ FUME HOOD





Life Sciences teaching laboratory with movable tables and overhead service carriers allowing for reconfiguration to support different learning modes. All laboratories have windows to the exterior or atrium and A/V technology.



The central Science Commons serves as a living room for the facility with natural light, views into the laboratories, classrooms, and study spaces, and a variety of seating options to support an active and collaborative learning environment.



Physics teaching laboratory with movable tables and folding glass partition which can open to the adjacent Computer Laboratory for integration of experimental and computational laboratory activities.



Each floor features a variety of different collaboration spaces with a range of furniture styles, open vs. enclosed rooms, folding partitions, views into the atrium, and flat panel monitors to support student study and peer learning.



General Chemistry Laboratory with instructor-controlled backdraft ventilation grilles at each student station. Groups of laboratories are connected with a central Prep Room via a 'ghost corridor' for efficient laboratory prep.



Corridors are activated with a distinct color scheme on each floor; 'science on display' with windows into laboratories, tackable walls and flat panel monitors; and built-in padded seats for students awaiting classes.





Learning Spaces Collaboratory Roundtable
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Loyola Marymount University

Driving Questions

1. How are emerging technology trends affecting / improving learning spaces? Including:
 - a. Extra-wide, blended, interactive displays and displays integrated into the fabric of the building.
 - b. Team collaboration stations
 - c. Wireless collaboration tools
 - d. The migration of AV technology to data and software (from physical wiring and hardware boxes)
2. How do you integrate the professional lab environment with the classroom environment (or more accurately capture the on-demand teaching moments with classroom technology in a lab with chemicals or a clinic with patients)?
3. How do you make a building with very high technical demands pretty and friendly?
4. What programs and support are required to ensure the proper adoption and use of new technologies within the classroom environment?
5. What are the metrics for making sure a new technology or teaching method is successful within the environment and classroom?
6. How do you keep students engaged outside the classroom fostering the continuation of team collaboration?

As the first new building designed under the LMU Campus Master Plan, the 120,000 square foot science center establishes new campus aesthetic standards in a modern, interdisciplinary facility for biology, chemistry and natural science. The science center contains teaching laboratories, lab support space, faculty offices, classrooms, shared public spaces, a 300-seat auditorium serving the entire campus, and active learning classroom with three side-by-side joined interactive projectors and a 370-vehicle subterranean parking structure.

The project objectives of achieving interdisciplinary collaboration, sustainability, and connectivity have informed the design process, resulting in a prominent campus building that will itself serve as a teaching tool. The project simultaneously integrates LEED Gold certification and "Labs21" research facility performance criteria into the design.

The building's other main academic features include:

- 50 faculty and staff offices
- 34 teaching or research laboratories
- 7,300 square feet of laboratory support space
- 3 conference rooms
- A green roof and outdoor laboratory
- Continuous provision of classroom and wireless technology indoors and outdoors.





Interactive Classroom with wide interactive markerboard/display wall and reconfigurable student active learning flexible team stations.

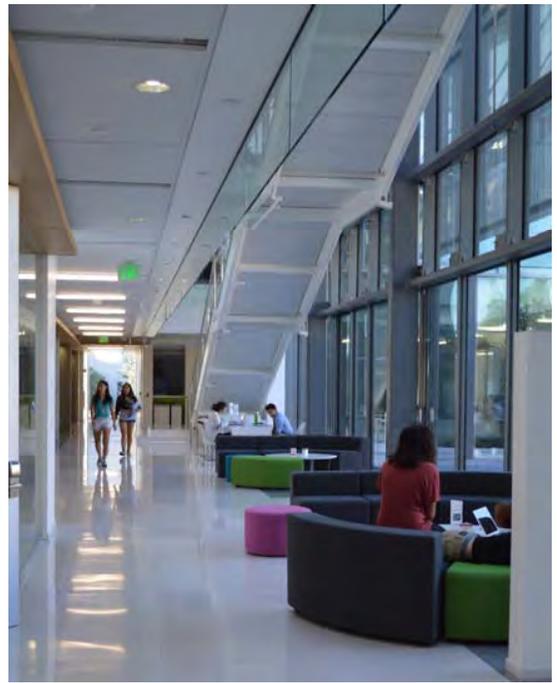


Large 350-seat lecture hall / event space with integrated display and rear technical control position.





Chemistry lab with integrated lab-safe data and AV demonstration technology.



Interactive Classroom showing active team stations rear screen and distance education cameras.



Student team collaboration areas.



External patio, auditorium pre-event space and outside classroom area.



Additional external student spaces and coffee cart along building walkway.



Learning Spaces Collaboratory Roundtable
 Spring 2016: Focusing on the Future of Planning Learning Spaces
 University of Illinois at Chicago

Driving Questions

1. Awareness: How do we manufacture spatial configurations that drive awareness of the learning experience through visibility, vertical integration, and cultural connectivity?
2. Proximity: What do we know about manufacturing spaces that enable proximity, aware the probability of knowledge exchange is proportionally related to the proximity of co-workers (co-learners)? Being on a different floor is being in a different world. (Tom Allen—MIT)
3. Connectivity: What do we know about manufacturing spaces that enable connectivity, enable the informal, chance encounters that support dynamic connections, networking connections?
4. Ambiguity: What do we know about manufacturing departmental networks, about translocating people and programs in ways that break-down departmental silos?



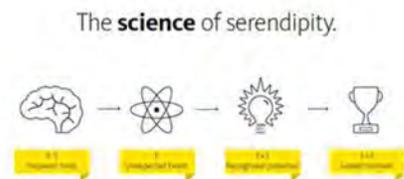
People believe that serendipity is about luck. About finding value in chance. But what if it's not? What if it can be manufactured? We think it can.

If the traditional model of faculty offices being isolated from learning space was upended, would collaboration take hold? If faculty and students could always see each other, and were encouraged to interact with increasing frequency, would something magical take place? We think it would.

On many college campuses, faculty offices are, by design, remote from where learning actually takes place - often perched high above the students logically because of code exiting requirements. But at the University of Kansas' new 167,000 square-foot Business School, Capitol Federal Hall, faculty are on full-display of students, and students of faculty. Classrooms, incubators and financial laboratories occupy a single, linear volume, while faculty and administrative offices occupy a neighboring one. Between them, a four-story atrium with a dynamic stair plays the crucible - the birthplace of innovation. The ground floor is split on two elevations, stitched together by a serpentine social stair which doesn't simply play lip-service to the campus' notable topography, it marks the transition from the plains that typify the far reaches of the University to Mount Oread. It provides a crucial place for students to gather and observe.

The architecture is a simultaneous nod to the University's architectural legacy and a bold charge toward its future. The building opens itself to Allen Fieldhouse, the cultural center of campus, and many of the key spaces within offer framed views of the hallowed arena. In negotiating the old and the new, the high and the low, the student and the teacher, Capitol Federal Hall doesn't just hope for the serendipitous. It creates it.

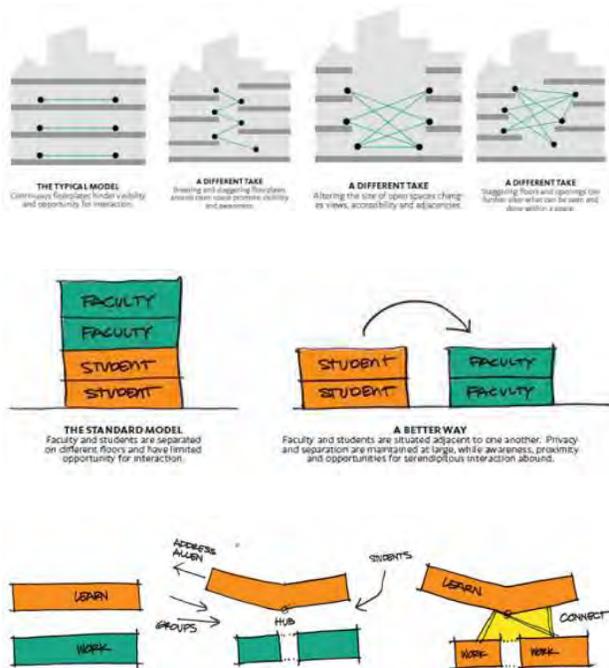
This is how you spark innovation. This is what's next in Business.



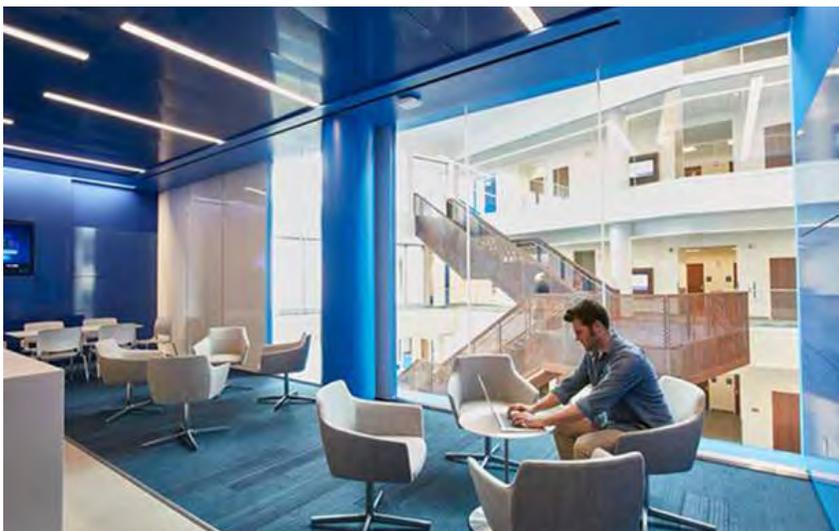
Manufacturing Awareness.

Question 1

The dean's vision was simple: She wanted every student at the University of Kansas to pass through the business school. She wanted to teach every student the basics of business—how to balance a checkbook, etc—regardless if they were a business major. The building was designed to create opportunities for serendipitous interactions. The stacking of the floor plates—strategically placing the office bar next to the classroom bar (instead of on top as typically done). The bending of the North Bar to funnel other campus students through the building. The transparency of learning that occurs in every corner to engage once the participant is in the building.



Manufacturing Proximity.



Being on a different floor is like being in a different world.

Tom Allen, M.I.T.

Question 2

Two people are more likely to interact when they are on the same floor versus different floors. Different buildings is even less likely. It is critical when people are in those buildings/ within those same floors that we take advantage of as much visual connectivity as possible. Visual connectivity does not mean lack of privacy. The rooms shown in this photo have movable white boards on tracks that can allow for the space to be completely closed off, or filtered to allow for some privacy, or left completely open as shown here. The level of connectivity shows vitality, conveys energy and develops a soul for the building.



Manufacturing Connectivity.

Question 3:

Sometimes the most enlightened discoveries come from the most unlikely situations. Through strategic integration of disciplines and activities you can manufacture highly integrated spaces and places throughout every corner of your building. Pulling activities from the program out into the common areas, providing places for students and faculty to linger longer, by engaging a deep story into the daily path of thousands of students, these all create a rich canvas for new innovation to occur.



Manufacturing Ambiguity.

Question 4:

The team strategically looked at dozens of different office and classroom configurations for this project. The client's vision was for transparency and honor of business. This can't happen behind closed doors or within individual private offices. Through clear client vision, the base necessities were accommodated within faculty office areas, and a focus was given to common space activities. The belief was to encourage the leadership of the institution to be within the common spaces as often as possible, to encourage the serendipity to occur. Gensler research into corporate work places has found that companies who give their employees choice—choice of where and how to accomplish their work—are the highest performing companies. This same philosophy when applied to an educational space is what was created at The University of Kansas.



Learning Spaces Collaboratory Roundtable
 Spring 2016: Focusing on the Future of Planning Learning Spaces
 University of Illinois at Chicago

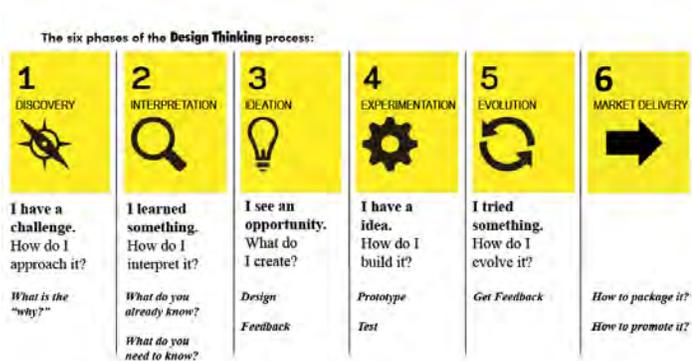
Driving Questions

1. How does research on learning— learning as social, contextual, real world—inform the design and spaces in which students prepare for life and work in the world beyond the campus?
2. How is our planning influenced by research on how students from diverse backgrounds and with different career aspirations are motivated to persist and succeed in acquiring essential work-related skills?
3. How do expectations of what students should be able to do upon graduation (as those articulated by national associations such as AACU & BHEF) influence how we think about the experience of learning in facilities and spaces we are designing?
4. In our planning, how do we capitalize on the unique potential of new kinds of collaborations— across the educational pipeline (middle school through baccalaureate) and with community and regional stakeholders?
5. In the spirit of supporting Project-Based and Competencies-Based Learning, how can facility design better enable a robust Design Thinking process? How can we ensure that students and innovators have an appropriate palette of spaces for individual creativity, contemplation, collaboration, prototyping, testing, and presentation? What does a learning space look like in order to support this full spectrum, iterative, process of invention, where students can shift through spaces in a selfdirected fashion?

The Missouri Innovation Campus (MIC), covering grades 10-16, is a program comprised of unique partnerships among the University of Central Missouri (UCM), Lees Summit School District (LSR7), Metropolitan Community Colleges, and regional businesses to create the nation's most accelerated degree program. The MIC program was started 4 years ago to address the rising concerns of 21st century students demanding to graduate earlier with less college debt and higher job placement rates as compared with traditional college programs.

To fulfill these needs, the Missouri Innovation Campus' new facility (completion targeted fall 2017) will feature a collection of highly flexible learning spaces that seek to optimize collaboration and professionalism akin to professional work environments. The building is organized in "Academic Quads" – centered on departments. UCM and LSR7 each utilize the building during the day, and UCM takes over more shared space in the evening.

Central to each "Departmental Quad" is an "Ideation Commons"—a hub— that serves as a "Third Place" and fosters authentic collaborative behaviors. The Learning Studios and Labs flanking either side double as open workspace for individuals and student teams. The fluidity of the space replicates the organic workflow in professional environments – teams move from mode to mode at their own pace, as much of the instruction follows a flipped classroom model. Informal briefing areas can quickly adapt into student work space. Vertical atrium connections between floor levels further encourage cross-disciplinary pursuits, many of which are initiated simply by the resourcefulness of the students striving to find solutions to their projects.



Source: Stanford D-School, Stanford University
 Updated: STEAM Studio, Gould Evans and Rockhurst University



6. In our planning, how do we capitalize on lessons learned from unique workplace designs illustrating the value of agile and flexible spaces, spaces in which the soft skills of leadership, entrepreneurship, and communication are as essential as the ability to work in teams, solve problems, advance knowledge?

7. How do we address the human side of change (and innovation) in education? How can the design process include a design effort to support new pedagogical methods (teacher training)? How can an institution improve success rates with new facilities via effective "User Commissioning"?



Two pilot learning studios were developed early in the design process. As both institutions explored innovative new teaching and learning methods, the concurrent training of faculty and evolution of the learning culture were critical pathways. Ongoing assessments of these spaces, including interviews and observation continue to guide the design refinement of the final learning spaces.



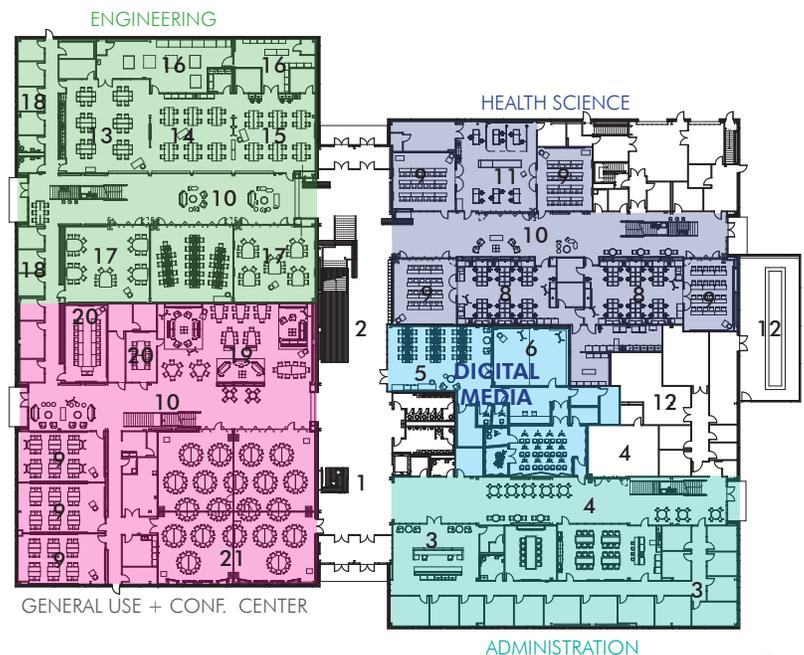
The Central Commons is the hub of the building, connecting to all Departmental Common Entry Porches. It's multi-functional including a "public learning studio" which is used for instruction, tour orientations, and student presentations including pitches and student TED Talks. The second floor balcony doubles as gallery viewing space. Showcase programs are on display around the perimeter.

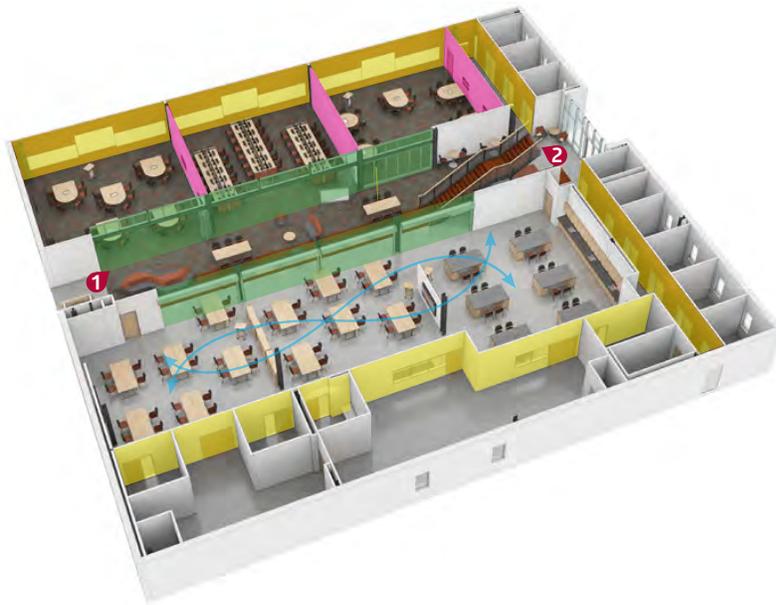


Both primary tenants of the new facility (the University of Central Missouri and Summit Technology Academy) share an administrative suite directly off the Central Commons. The shared Info Center manages security access at the front door, directs traffic, and welcomes visitors.

FLOOR PLAN KEY LEGEND

1. Info, Reception
2. Central Commons + "Stage"
3. Shared Administration
4. Student Center + Bookstore
5. Digital Media Lab
6. Video, Lighting Studio
7. Studio Live Room
8. Biomedical Innov. Lab
9. Learning Studio
10. Ideation Commons
11. Allied Health Lab
12. Building Support
13. Engineering Lab
14. C.I.M. Lab
15. Digital Electronics Lab
16. Shared Workshop
17. Flex Digital Lab
18. Faculty Office
19. Flex Learning Studio
20. Break-Out & Touch-Down
21. Conference Center





FLEX STRATEGIES

- No walls
- Movable walls
- Soft walls
- Hard Walls

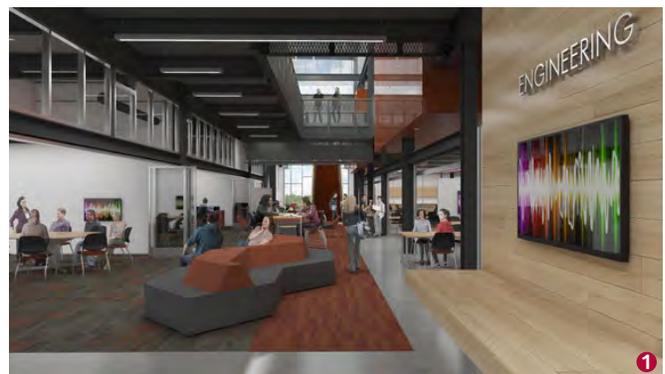
Typical Department "Quad" centered around an "Ideation Commons" – Engineering, Design, and Drafting shown



FLEX LEARNING STUDIO: Inspired by contemporary workplace models and project goals to migrate toward competencies-based learning, Flex Studios replace traditional classrooms in several locations. These are open work and learning environments for self-directed and team-based learning where abbreviated instruction is supported with adjacent enclosed Briefing Rooms and open "Briefing Pods" (delineated in red) within the Flex Studio.



INTERNATIONAL STUDIES LEARNING STUDIO: Learning Studios borrow design concepts from open workplace models, where students can self-organize in small groups, large teams, or individual work settings. The palette of instructional tools includes both digital and analog, as well as fixed and mobile systems enabling selection based on student preference.



Each "Departmental Quad" is identified with an "Entry Porch" fronting onto the Central Building Commons. Here, student guides meet with visitors and provide tour intros, share sample student projects, and demo program features associated with the department.



A "Back Porch" anchors the opposite end of each "Ideation Commons"; a third place for student and faculty socialization, eating, and informal mentoring. Faculty offices are located adjacent, making faculty feel more approachable and fostering student/faculty interaction as in the workplace.





HANBURY



Renovation and Expansion of STEM Facilities

Rhodes College

Firm: Hanbury

Firm Representative: Timothy F. Winstead, AIA

Learning Spaces Collaboratory Roundtable

Spring 2016: Focusing on the Future of Planning Learning Spaces

University of Illinois at Chicago

Driving Questions

1. How can we transform the impression that people have of our aging science facilities?
2. How can we create increased connectivity between departments and increase interdisciplinary activities?
3. Can we upgrade existing facilities to meet the needs of current and future pedagogies?
4. How do we increase student and faculty connections amongst multiple STEM facilities?
5. How do we create new state of the art STEM facilities within the historic fabric of an iconic campus?
6. How can we create spaces for interactive learning outside the classroom?

Completed in 1965, the Frazier Jelke Science Center (Biology) was constructed below grade with a plaza, the Rhodes Tower (Physics) and Ohlendorf (Math) sitting above. The building also connected to the basement of Kennedy (Chemistry, c. 1935). Opportunities for interactions outside the classroom were limited to a series of below grade corridors that provided no social space for students and faculty engagement. Exterior “gardens” located at the lower level provided daylight for some spaces but had limited value as spaces for collaboration.

While accommodating the need for growth in STEM related programs, Rhodes also wanted to enhance the opportunity for collaboration amongst students and faculty outside of the classroom and increase the level of interdisciplinary activities.

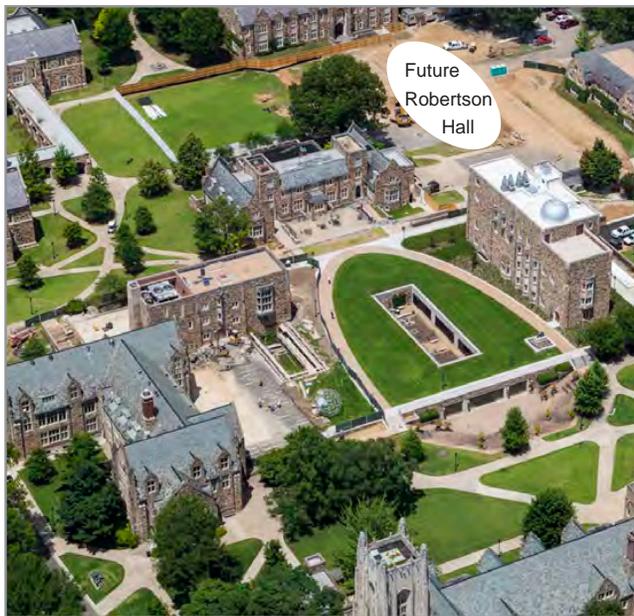
The solution was a series of renovations and the construction of a new interdisciplinary science building. Renovations will include recapturing under utilized space, transformation of aging laboratories and by enclosing one of the below grade gardens, the creation of a new social center for the sciences. Distributed throughout all of these facilities will be spaces for collaboration amongst students and faculty.

In addition to renovation of the existing science facilities, the former student center, Briggs, is being converted to classrooms and labs for math and computer science. Briggs will also provide a new multipurpose space for the science complex overlooking one of the many quadrangles on campus. Robertson Hall (the new interdisciplinary science building) will also face the quad and connect to Frazier Jelke at the basement level.

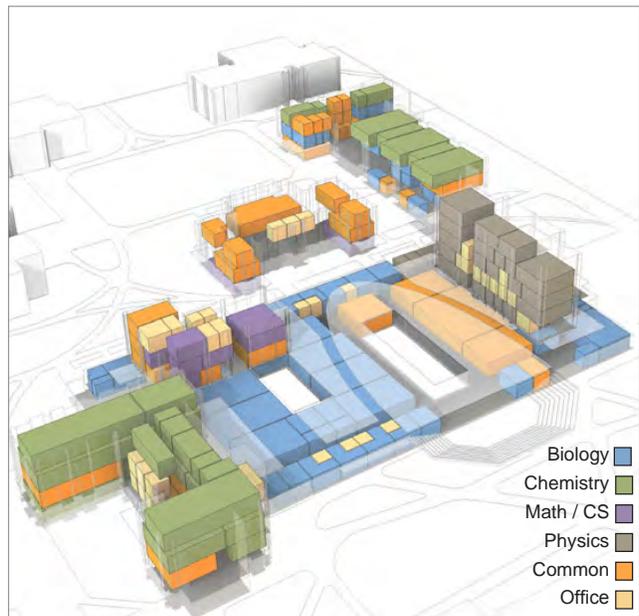
Robertson Hall will provide new chemistry and biology teaching labs in addition to much needed research space. The new building, designed to fit within the Collegiate Gothic Architecture of the campus, will become a hub for interdisciplinary activities and has been designed to optimize student engagement with the sciences.



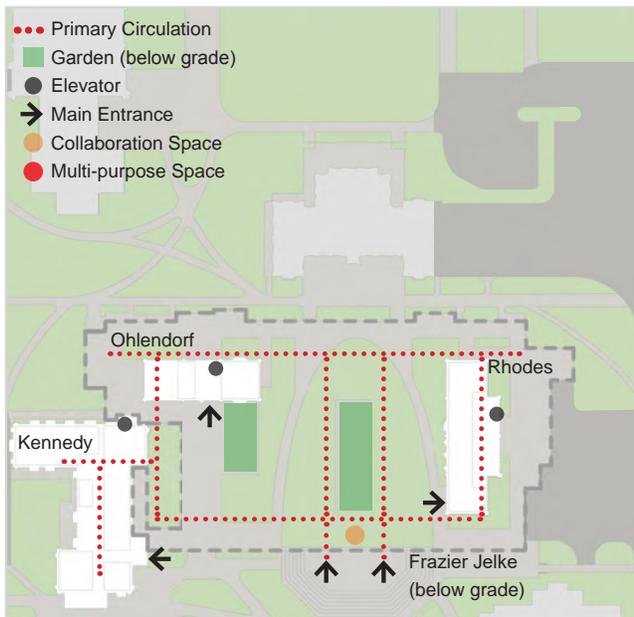
Rhodes Collegiate Gothic Campus



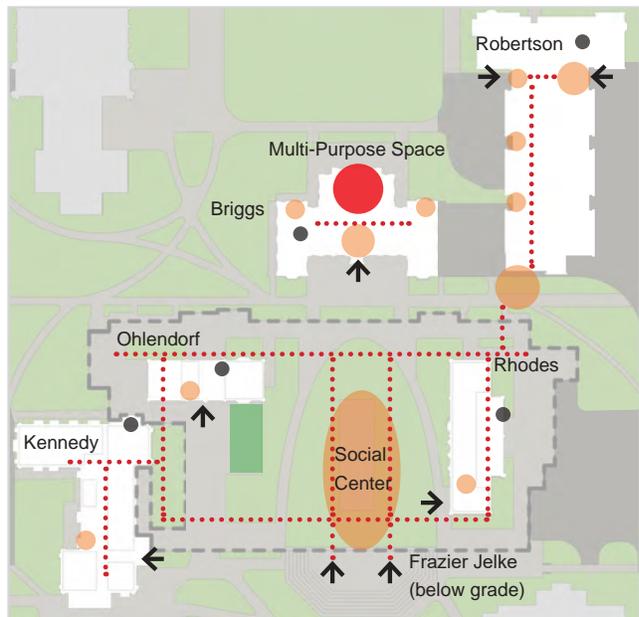
Science Complex - Rhodes College



Program Distribution



Site Plan - Existing Collaboration Space Location



Site Plan - Proposed Collaboration Space Locations



Existing Lower Level Garden - Frazier Jelke Science Center



Reclaimed Lower Level Garden for Social Center





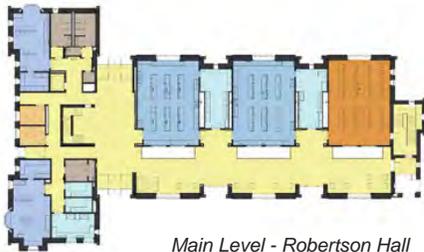
Building Exterior - Robertson Hall



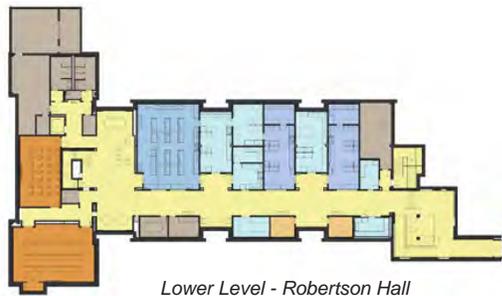
Main Level Corridor - Robertson Hall



Upper Level - Robertson Hall



Main Level - Robertson Hall



Lower Level - Robertson Hall



Collaboration Space - Robertson Hall



Collaboration Space - Robertson to Frazier Jelke Connector



Existing Student Space - Frazier Jelke Entrance



Resource Room - Rhodes Tower Renovation



Driving Questions

1. How can the metaphor of a learning street drive the planning of 21st century learning spaces? Can we imagine a learning street as a single space, a cluster of spaces, spaces serving formal and informal learning?
2. How can walls become a critical 'spatial affordance' of learning spaces that serve 21st century learners, that enable and enhance the process of externalizing what is being learned, of putting nascent ideas out for examining and critiquing and reshaping?
3. What are the affordances of a space that inspires, motivates and nurtures 21st century learners?
4. How do we furnish and equip a learning street so that it allows for faculty to interact in different ways with students, to move to and from groups large and small? How do we imagine the role of the faculty member in such a space?
5. How can a registrar-assigned space (classroom) provide the flexibility as a formal learning spaces to accommodate different pedagogical approaches and course enrollments as well as a space for informal learning?
6. How can the design of an individual learning space inform and influence larger building scale design approaches to create new spatial concepts that are flexible and high performing?

While the design of today's active learning based classrooms has begun to better align with the pedagogical shift of viewing students as content and knowledge creators versus consumers, the spatial qualities and architecture of these 'wired but not inspired' spaces is still in need of attention from the design community to allow them to more effectively support, contribute and inspire the team-based learning taking place within them.

As part of a MiAPPA (Michigan Association of Physical Plant Administrators) presentation HED gave regarding shaping a Higher Education Campus for the next generation of students, a vision of a classroom concept named 'The Learning Street' was developed that focused on the importance of creating immersive, experiential team based learning spaces.

The seed of the idea of the 'Learning Street' came from the simple concept that there is a level of comfort and intimacy in a student team setting that is proximate to a wall surface that allows access to it for pinup, white board, flat screen technology or as a presentation backdrop. The spatial qualities of this wall /table & chair relationship seem to promote discussion and provide teams with just enough of spatial definition that allows them to focus and interact more effectively. This idea matured into the concept of a wall intensive more linear space that is activated at its perimeter, integrated with all the necessary team tools, and open at its center and ends to promote both an intimate yet open spatial dynamic. The metaphor of a tree lined street, open at the ends, energized and alive at its edges, intimate in its spatial qualities was utilized to further develop the architecture of this space.

This classroom concept was also conceived within the framework of trying to understand how it informs the bigger picture at the scale of a building. Flexibility, formal /informal space relationships, scalability and ideas centered on strategies of creating dynamic, immersive learning environments drove this exploration. The result was the intertwining of 'flexible bars' of space that created a dynamic network of formal and informal spaces that creates strong engagements with its surrounding context.

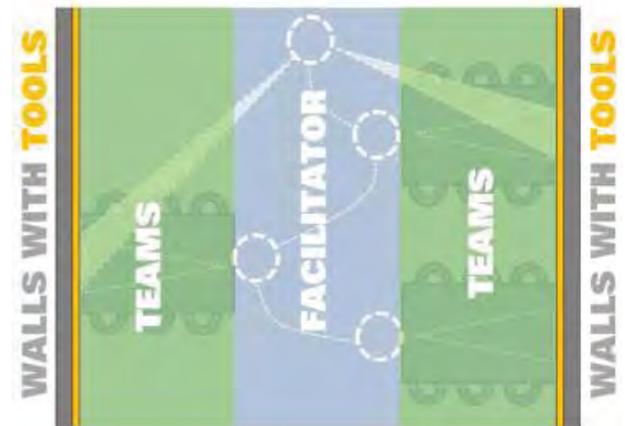




'The Learning Street' Classroom – 30 Occupants



Tree Lined Street Spatial Metaphor

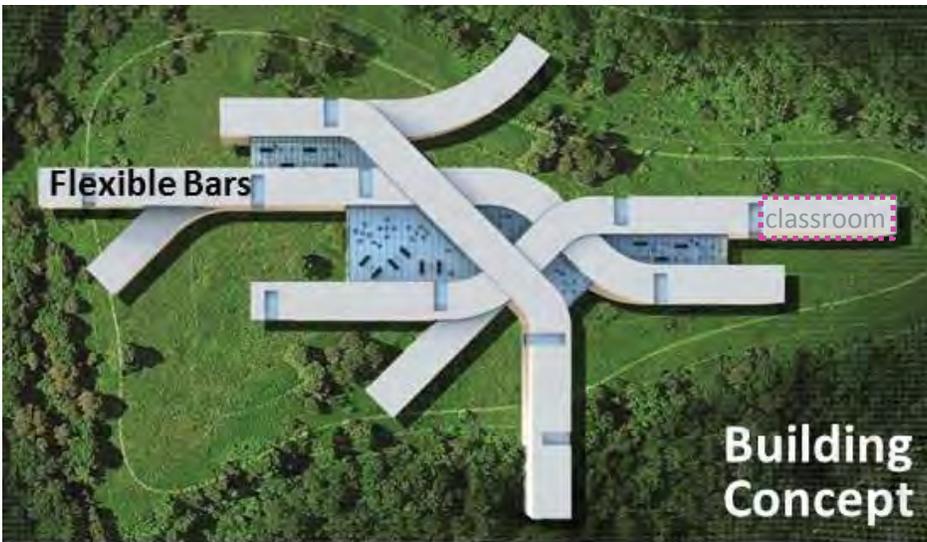


Energized Perimeter with Integrated Tools

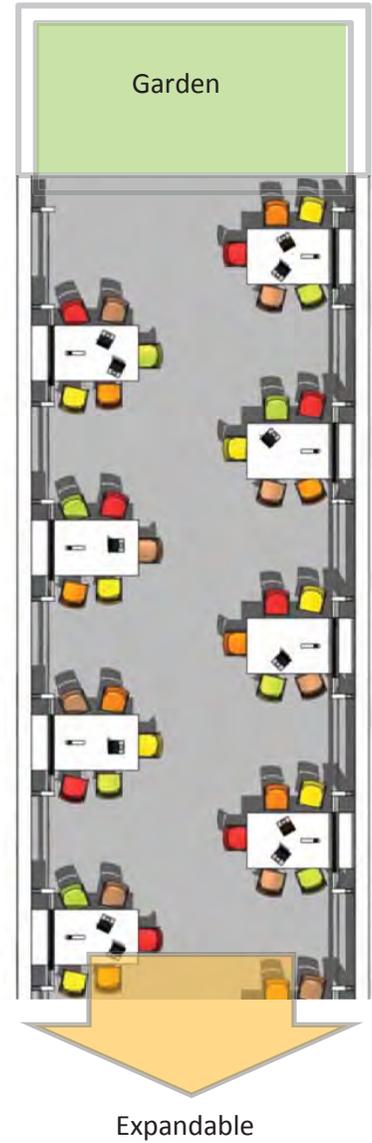




Flexible Spatial Model - 60 Occupants



How Individual Space Ideas Inform the Larger Picture of Learning Environments



Learning Spaces Collaboratory Roundtable
 Spring 2016: Focusing on the Future of Planning Learning Spaces
 University of Illinois at Chicago

Driving Questions

1. How can we make the excitement of science more visible to those walking by and through the building? What are the ways that we can express it to the outside, in the common areas, and into the laboratories? Are displays still effective? If so how do we keep them active?
2. How can we create a more interdisciplinary community that encourages faculty and students from various departments to interact? Can learning and research spaces be shared between departments? What will draw students and faculty together across disciplines? How can we draw non-science majors into the building?
3. How can we design instructional and research spaces that support active hands-on inquiry in a class-wide, small group and individual setting? How can research and teaching functions be integrated. How can we better anticipate the instructional and research needs of the future? What role will technology play?

For many years the Beloit College sciences had established a reputation for active hands-on learning and interdisciplinary inquiry. Amazingly these programs originally took place in an existing 60's science facility that suffered from many deficiencies. These deficiencies included long double-loaded corridors with no visibility to the labs or communal gathering space, low floor-to-floor heights, and departments completely separated by floor.

Our goal was to create a facility that provided a proper setting for the programs that had already been put in place. These were our shared objectives as we designed the science center.

1. The excitement of scientific investigation should be made visible.
2. The facility should foster a sense of community across disciplines.
3. Teaching and Research spaces should support active inquiry.

As we began to study alternative possibilities we discovered that a street separating the south and north parts of campus could be vacated and an entirely new science facility could be built in its place. This strategic location provides a number of advantages. It creates open views to and from the building and it serves as a connector that links the south and north parts of the college so, as students cross campus, they can easily circulate through the building and be exposed to the sciences.





Interactive Classroom



Flexible Teaching Lab



Research Lab



Site Plan

First Floor Plan

The programs for the sciences are organized around a multistory atrium that creates a central community space and provides a visual connection to all of the departments. Balconies that project into the atrium are more intimate spaces for small groups of students to meet informally outside of the labs. Rather than locating the departments on separate floors they are distributed throughout the building resulting in a rich mix of spaces. Introductory teaching labs for all of the departments are located on the lower levels of the facility while more advanced teaching and research labs are located on the upper levels. This arrangement helps to support interdisciplinary investigations.

Teaching labs and classrooms are designed to support both class-wide instruction and small group work of three to four students. Research labs and instrument rooms are connected to the teaching labs. This promotes the use of sophisticated instrumentation for instruction and provides expansion space for research projects during the summer when classes are not in session.





Learning Spaces Collaboratory Roundtable
Fall 2016: Focusing on the Future of Planning Learning Spaces
California State University Los Angeles

Driving Questions

1. In the context of the full building renovation, what is the new role of the Library on Campus?
2. Where is the best location for the new ALC both physically in terms of its size and synergistically in terms of opportunities that result from new adjacencies?
3. How is the planning & visioning for this project influenced by a shared understanding of how learning happens and about what kind of learning experiences nurture learning that is deep & transferable?
4. How would you describe this project to your department? To naysayers? To potential supporters?
5. The Active Learning Classroom is all about flexibility, but some parameters are needed move ahead. How much flexibility is really needed? Which of the multiple flexibility criteria gets privilege over the others?
6. What resources will be available to support the success of the new pedagogy of this new space?
7. What does the location of the ALC within Library mean for issues like staffing and security?

The UCSC Active Learning Classroom (ALC) is a 3,000sf classroom within the Science & Engineering Library (SEL), a 1991 building originally designed by EHDD and one of two academic libraries on Campus. The SEL traditionally housed UCSC's collections related to the Physical & Biological Sciences, Math, and Engineering, but as technology and research practice within the Sciences has evolved, SEL's physical collections have become a less significant part of the library's usage. The stacks no longer define the library. The library continues to play a significant role as a community hub, student study space, and place to access digital information, especially as the undergraduate population increases overall, while its bigger role in supporting and enhancing academic collaboration and student learning continues to evolve.

The new Active Learning Classroom in the Science & Engineering Library is the first phase of the full renovation of the Library to support this vision. The ALC will facilitate project-based, active learning techniques for up to 95 students, elevating the dialogue around learning and cross-disciplinary opportunities on Campus in general while also supporting the future vision of the Library as the center of knowledge and heart of new teaching modes and technology integration. Finishes, furniture, and technology within the ALC are all designed to maximize opportunities for flexibility, adaptability, and interaction, allowing faculty and students to use the newest and best tools for teaching and learning. Abundant interactive technology and full height marker walls line the room supporting a variety of teaching styles and furniture arrangements, from collaborative clusters of 4-8 students to interactive lectures and traditional exam formats. A bold graphic wall dividing the new ALC from the adjacent library commons announces its presence within the library and allows visibility into the active learning environment through large expanses of glass. Flat panel displays on the same wall will also serve as "billboards" for displaying research happening throughout Science Hill, making the library and ALC a core of dynamic, collaborative engagement of cross-disciplinary conversations.





Active Learning Classroom floor plan and furniture layout options showing flexibility and sample of range of teaching styles that can be accommodated





Learning Spaces Collaboratory Roundtable
Fall 2016: Focusing on the Future of Planning Learning Spaces
California State University Los Angeles

Driving Questions

1. How can an historic academic building be respectfully renovated while being transformed into a contemporary STEM learning and research facility?
2. What program distribution model will obtain maximum efficiencies working within the existing historic building's infrastructure and constructs?
3. How can the Department of Physics (or any Department) retain a cohesive identity within the final program distribution while allowing for multidisciplinary learning and collaboration?
4. What minimal modifications to the existing building will achieve the highest and best results in delivering highly utilized and activated collaboration areas in support of a STEM education?
5. Thinking out of the box; is there a fresh approach to a building's organization that would reinforce collaboration and interaction amongst its users?
6. How can the program organization reinforce the desired connection between learning and research?

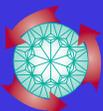
Project Description: The Corcoran Hall Renovation at George Washington University is a comprehensive historic renovation of the first building on GW's Foggy Bottom campus incorporating STEM learning pedagogies. The approximately 47,500 gsf building will be renovated to accommodate the Department of Physics and general-use classrooms. The goal of the project is to create spaces that are conducive to a collaborative and intellectual environment, meet the users' needs and provide flexibility for growth.

Program Distribution: HOK and GW developed a concept that distributes the program with both efficiency and the specific needs of the Department of Physics in mind. Large general-use classrooms are located on levels one and two, while a Physics Optics Lab and Advanced Instructional Lab are located in the basement. Physics research spaces are placed on the two upper floors. This distribution offers convenient access to the classrooms for the general student body, while maintaining a level of privacy and cohesion for the Department of Physics.

Research areas are organized in mixed-use clusters to encourage collaboration between all members of the Physics Department, including undergraduate, graduate and post-doctorate students, faculty and administrators. These research communities have been designed to foster innovative thinking and a collegial environment.

Exterior Improvements: As a historic building, Corcoran Hall must be given special consideration. The most significant exterior improvement will be the replacement of the existing windows with energy efficient systems in the style of the original historic divided lights. Brick masonry repointing and stone trim repair will be completed. Existing historic wood entry doors will be refinished and reinstalled. A new glass canopy will also be installed above an existing exterior egress stair.

Existing Interior: The original Corcoran Hall has a traditional layout of classrooms and labs on each side of a wide double-loaded corridor. Currently, there are no spaces designated for collaboration or informal learning to occur. The existing corridor walls are solid masonry and offer no visibility into the academic spaces or access to borrowed light from perimeter windows. This creates a large central corridor that is poorly lit, underutilized and disconnected from the activities of the building. There are adjacent buildings on each end of the building which further prohibit access to natural light.



New Interior: As a STEM facility, Corcoran Hall should express the qualities of an integrated space. The connection between research and learning should be evident. Activity in the building must be visible, creating a visual link between public spaces and learning environments. The un-programmed “spaces in between” -stairways, corridors, and alcoves- become facilitators of casual meetings and collaboration.

Project completion: Nov 2017. Upon completion, the new Corcoran Hall will be a beautiful and function building that combines the historic character of the original structure with the architecture serving current pedagogies associated with collaborative learning.

SECTIONS



Initial design sketch and 3D model of building section with stair and adjacent collaboration and interaction areas

DESIGN IMPLEMENTATION STRATEGIES

1. Create intentional collaboration spaces. The design distributes a combination of open and enclosed touchdown areas throughout the building. These spaces will be located off the main corridor and will include a combination of tables and chairs, soft seating, technology and glass marker boards.
2. Activate the main corridor. The renovation will visually connect the corridor and instructional/ research spaces with full-height glazing at central meeting spaces and glass lights in doors. Two things result, Science on Display and natural light in the corridor. Alcoves off the corridor include built-in seating, display areas and writable surfaces. This, in conjunction with the collaboration spaces, will strengthen the building core and increase the opportunity for collaboration and other activities.
3. Create an anchor. The existing center stair is already quite open and light filled from the large exterior windows. However, as an egress stair, it is closed off from the main corridor with fire-rated walls and doors. Existing building egress components will be modified such that this center stair will no longer be a required means of egress. In doing so, this center stair will become an open vertical connector stair. The walls and doors between the stair and corridor will be removed, providing a visual anchor at the center of Corcoran Hall and bringing additional natural light into the corridor. The stair will be transformed into a bright and inviting space providing a vertical anchor for the building that is visible from both the interior and exterior.

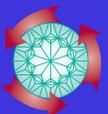


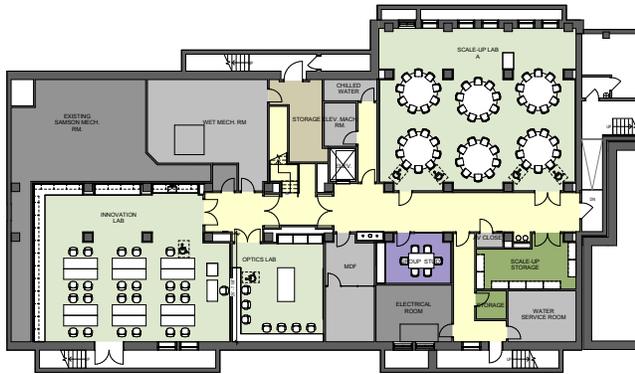


View of flexible interdisciplinary learning classroom

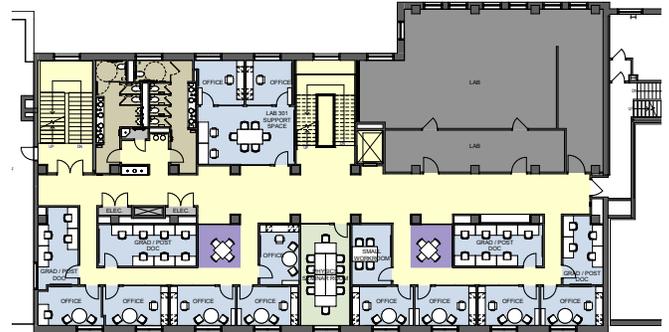


Existing exterior view of Corcoran Hall- the first academic building on GWU campus

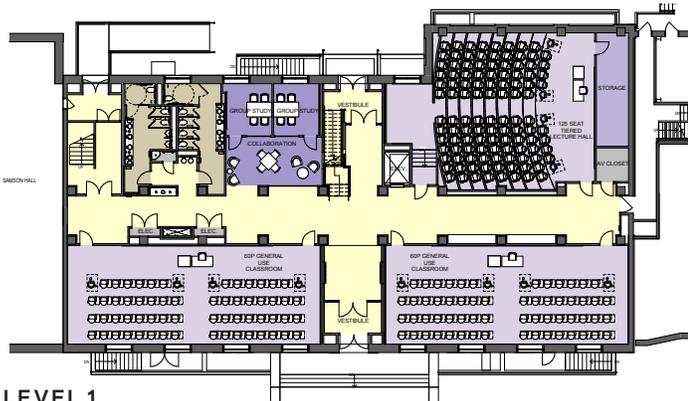




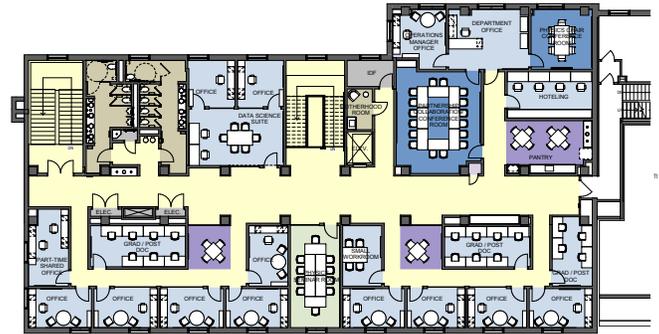
BASEMENT



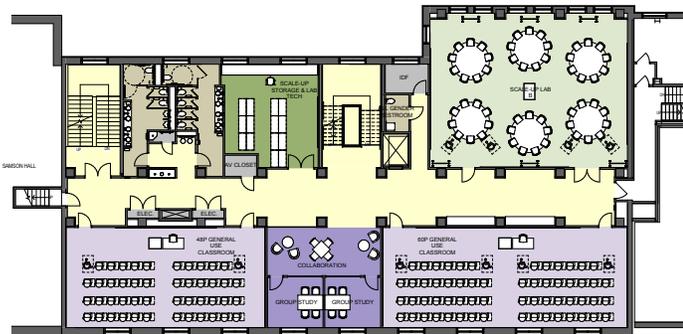
LEVEL 3



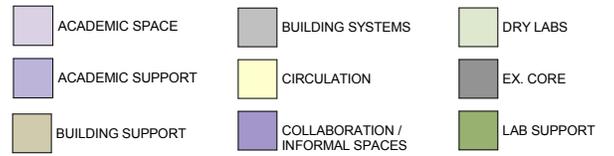
LEVEL 1



LEVEL 4



LEVEL 2



Learning Spaces Collaboratory Roundtable
Fall 2016: Focusing on the Future of Planning Learning Spaces
California State University Los Angeles

Driving Questions

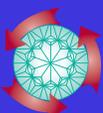
1. How do we react to, take advantage of the existing building's opportunities and limitations in ways that supports the vision of the College of Education (the tenants for the renovated spaces)?
2. How can the physical environment help open minds? How can it also encourage future teachers to do the same?
3. Given the evolution of educational technologies, how do we arrive a spaces for the College of Education that remain relevant? What aspects of the current social media culture are lasting, promote genuine learning? What opportunities should be provided to capture learning as digital content and then share it? What are the effects of technologies on space?
4. How do create spaces that enable group learning? How do we enable this to happen in formal and informal spaces? When, where and why do groups interact now? How will they interact in the future? What kind of spaces will enable such future interaction?

In 2012 the College of Education at Winona State University began outgrowing its home on the campus. The group of academic departments focuses primarily on teacher education. They also contain a Center of continuing education for teachers. The college needed a single place to co-locate all the college's departments. By doing so the college planned to harness the power of inter-disciplinary cross pollination. The university felt this plan would serve to springboard the College of Education to a leading institution of teacher education.

Also that year, the University acquired a small group of existing buildings that were originally school buildings. The buildings were spread across two city blocks one block from the east edge of campus and are uniquely arrayed in size. Cathedral School, Wabasha Recreation Center, and Wabasha Hall would become the College of Education's new Education Village. LEO A DALY was selected as the architect, and began designing the Education Village in collaboration with the College.

Wabasha Hall serves as the primary core for the Education Village. The existing outdoor courtyard provided an opportunity to create a space where students, professors, and visitors could casually interact. The space is intended to support interaction at many scales. The ground level is piazza-like, multi-use in nature, and is day lit from the south. From this central common space, visitors flow upward to the second floor, where two bridges connect east and west wings: one at the north and one at the south end of the common.

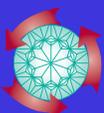
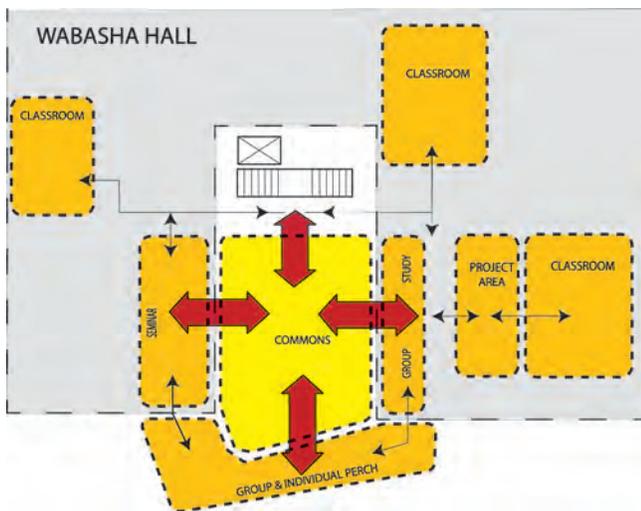
Informal small group study areas double as "theater boxes" looking over the commons. Collaboration zones emanate outward from the common and join classroom spaces. The original double-loaded wings of classrooms are broken down to mingle small groups, classes, and individuals, creating a dynamic environment for planned and opportunistic learning. The commons in Wabasha Hall will be a place where learning is on display - embodied in a powerful and visible example of learning at all scales, and in formats ranging from TEAL to STEM, electronics labs, Special Education learning environments, and seminar rooms.

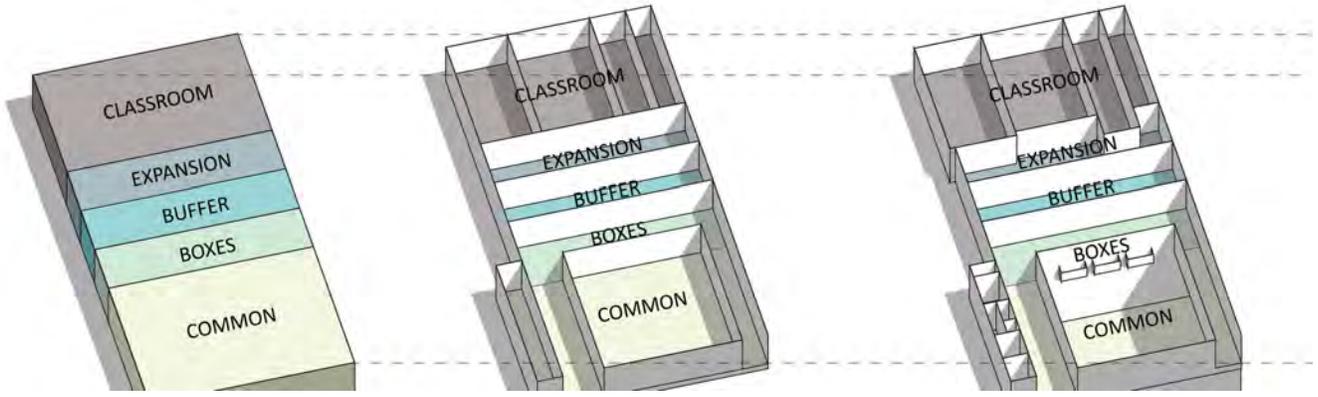


Cathedral School assumes a strong role promoting continued teacher development. The building houses administrative functions, the Centers for Teacher Success, and two classrooms. Constructed in 1919 as a class room building, its two classrooms will bookend the spectrum of teacher's class room experience at the college. One of its classrooms will retain historic elements such as the blackboard, coat room, and built-in wood casework and be updated with current technology. The other classroom will be more completely "modernized" into a contemporary classroom. In concert with the classrooms in Wabasha Hall, students of the College of Education will be exposed to teaching environments spanning a full range of spaces as they may encounter in practice.

Wabasha Recreation Center will maintain its existing climbing center and be given an addition to create an Outdoor Education and Recreation Center. The structure will house the Physical Education and Sports Sciences departments and contain departmental support functions and one classroom.

All three buildings will receive additions that will provide much needed accessible entries as well as increased programmatic functions. The additions allow the buildings to form three "faces" looking on to the greens and open spaces that are planned to the south. These areas will provide pedestrian paths connecting the Education Village to the main campus. The new additions will also stylistically mediate the three disparate building vocabularies. They will adopt a forward looking aesthetic, while drawing on the unique local geology of bluffs and dramatic hills formed of Winona stone.







Gehl-Mulva Science Center
St. Norbert College

Firm: Research Facilities Design
Firm Representative: Richard M. Heinz, FAIA

Learning Spaces Collaboratory Roundtable
Fall 2016: Focusing on the Future of Planning Learning Spaces
California State University Los Angeles

Driving Questions

1. How can a Sputnik-era science building be transformed into a modern, captivating active learning environment for both science majors and non-majors?
2. What attributes of the existing facility lend themselves to renovation for laboratory vs. nonlaboratory functions?
3. What features can be designed into the renovated facility to support future changes in pedagogy, technology and equipment over the life of the building?
4. How can the planning process facilitate development of a common vision among all disciplines and stakeholders to demonstrate the interconnectivity of the sciences?
5. How will the rejuvenated science facility promote transparency and put 'science on display' to engage occupants and visitors?
6. How can the addition and renovation components be phased to facilitate continuity of existing programs during construction?

St. Norbert faculty attended a PKAL Facilities Workshop in 2003 at Drury University and subsequently held a 'Summer Working Group on Curricular Reform in the Laboratory Sciences and Mathematics' in Summer 2005. This resulted in the preparation of a report outlining the desired learning outcomes for the laboratory sciences and mathematics, and the facility features necessary to achieve the desired learning outcomes. This group also prepared a Vision Statement that addressed dictums for the future of scientific discovery: Infusion and Interaction. Infusion referred to the integration of teaching and research throughout the curriculum. Interaction referred to developing interdisciplinary scientific relationships within the College community.

In the fall of 2005, St. Norbert College retained Research Facilities Design (RFD) to work with the college's faculty, staff and administration to prepare a Detailed Project Program document facility needs for the sciences for the next 25-30 years. RFD led the college participants through a series of interactive, participatory work sessions on campus to build on the work of the Summer Working Group on Curricular Reform in the Laboratory Sciences and Mathematics and on an existing building assessment for the John Minahan Science Building prepared by Performa, Inc. in 2003. The DPP was completed in March 2007 and addressed space needs for each department/discipline, desired adjacencies, site/campus context, building systems design criteria, and proposed renovation blocking/stacking concept diagrams.

In 2009, the College issued a RFP for the selection of an architectural/engineering design team with Performa, Inc. serving as the local architect, RFD as the laboratory design consultant, and ultimately resulting in the selection of CSNA Architects as the design architect. This team developed concept design alternatives for an addition to, and renovation of, the John Minahan Science Building. Eventually, the college worked with Performa, Inc. to refine the CSNA design and with the Performa/RFD team to execute the project. The team conducted iterative work sessions in the Schematic Design and Design Development Phases with full science faculty participation and 'sign-off'.



The final project provided building additions at the east and west ends of the existing facility for nonlaboratory functions such as faculty offices, classrooms, and collaboration spaces while the existing building was fully renovated to provide modern spaces for learning and discovery. Construction was phased to allow the science departments to 'stay in business' with ongoing coursework and research. The existing building was completely reskinned to modernize the exterior within the campus context and provide much larger windows for increased natural light and views.



Synthetic Chemistry laboratory featuring full view glass fume hoods to facilitate faculty observation of student experiments; ample natural light and views; open islands for instrumentation, write-up, and small group discussion.





Microbiology laboratory with aisle between pairs of benches to facilitate instructor circulation and group work around the 4-person islands. Layout supports active learning and accommodates integration of lab and lecture with A/V and IT support.



Geology laboratory with movable tables to facilitate reconfiguration, fed with power/data from overhead service carriers. Tables have butcher block tops to accommodate the wear and tear of rock specimens. Perimeter of the room provides a teaching wall and large open wall areas for charts and maps, as well as additional bench and specimen storage space.



'Science on Display' with viewing window from corridor into research laboratory.



The renovated interior features expanses of glass for 'science on display' with views into laboratories and display of scientific artifacts.



Anatomy Laboratory shared by St. Norbert College and the Medical College of Wisconsin featuring movable tables on wheels, open space for cadaver cases, overhead power cord reels, and flat panel monitors for display of specimens.



Reskinned exterior with much larger windows for natural light and views.





Learning Spaces Collaboratory Roundtable
Fall 2016: Focusing on the Future of Planning Learning Spaces
California State University Los Angeles

Driving Questions

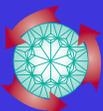
1. How are emerging technology trends affecting / improving learning spaces? Including:
 - a. Interactive displays
 - b. Team collaboration stations
 - c. Wireless collaboration tools
 - d. Virtual & augmented reality
 - e. Web collaboration & distance education, cloud-based services
 - f. Wireless presentation support
 - g. The migration of AV technology to data and software (from physical wiring and hardware boxes)
2. How can an existing space be redesigned to support new emerging technologies and pedagogies (e.g. room flexibility and dynamic/evolving presentation styles)?
3. How can new technology options help overcome infrastructure and space hurdles in the design of a renovated space?
4. What design challenges need to be overcome in coordination for supporting technology within a lab environment (e.g. cooling of equipment, storage, structural, supporting services to stations and waterproofing - both floor and counters)?
5. What is looked for in the design support of the immediate external spaces of an existing building to support new services (security, external wireless networking, outside classroom support and study areas)?

Starting in 2012, Steinberg, Vantage and RFD worked together with Whittier College to renovate and better utilize the original Science Building, rather than build a new expansion. The Science and Learning Center created a new style of learning spaces for the college to explore and evolve their pedagogies into the 21st century by providing new classroom and lab styles, student collaboration areas and the integration of new supporting technologies that foster in hands-on interaction and social collaboration. Residing street-side on the south end of the campus, the renovation will evolve this building into a new campus hub. The building planning incorporated new collaborative learning environments, seismic and accessibility upgrades and new utility infrastructure & equipment. The existing building was modified to create a new central two story building lobby that also supports student collaboration spaces and new building entry points.

The project objectives of achieving interdisciplinary collaboration, sustainability, and connectivity have informed the design process, resulting in a prominent campus building that will itself serve as a teaching tool for "Science on Display". Completion of the building is occurring for the Fall 2016 academic session with staff moving in for September.

The building's other main academic features include:

- New faculty and staff offices
- New teaching and research laboratories
- Laboratory support space
- Study spaces and conference rooms
- A green roof and outdoor student observation & team spaces
- Continuous provision of classroom and wireless technology indoors and outdoors.



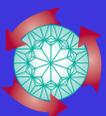


The original 1966 Stauffer Science Building was 4-stories but the new plan included a 5th floor “penthouse” that supported additional classroom space and a green roof. Additional areas were created to “pop out” of the face of the building that would support additional student study zones.



Open entry lobby and central transition to other floors. The renovation included a new central “sculptural” spiral staircase as well as new study spaces for students for team and social collaboration. Digital information signage displays campus events and information.

Classroom and research labs fluidly integrate technology into the lab stations and space to be truly integrated as part of the room aesthetics.





Reconfigurable active learning classroom with four interactive wall projectors and dry erase paint.



Interactive team lab classroom with station monitors for group collaboration.





The top terrace learning deck combinable interactive classroom accommodates both back-to-back instruction spaces to blend together into one larger group session.



The remodeled façade provides a nice new gateway onto the campus. New external security cameras and high-power wireless network antennas support both safety and student social collaboration around the building and into the quad area north of the building.

