Framework for Space Planning in the MIT Libraries: Phase One
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"The mission of the MIT libraries is to create and sustain an intuitive, trusted information environment that enables learning and the advancement of knowledge at MIT. We are committed to developing innovative services, strategies, and systems that promote discovery, preserve knowledge, and improve worldwide scholarly communication. We empower MIT through knowledge."

- MIT Libraries: Achieving a Desired Future State for 2015
Introduction

In the fall of 2011, MIT embarked on the development of a framework for space planning in the MIT Libraries over the next five to ten years. This report constitutes Phase 1 of this effort, which measures and compares library spaces at MIT, and articulates a high-level vision for library space use. Recommendations and conclusions have been developed to support the MIT Libraries’ Desired Future State, in harmony with the efforts of the Working Group on the Future of Campus Teaching and Learning Spaces, as well as the Vision 2030 Master Plan. In MIT Libraries: Achieving a Desired Future State for 2015, the challenge is framed as follows:

All North American research libraries face extraordinary challenges, driven by internal dynamics, institutional priorities, and fast moving external forces. These various forces and their implications... are catalysts for change within the libraries. They must be acknowledged and addressed appropriately if we are to continue to succeed in our mission.

MIT Libraries and Campus Planning and Design engaged the architecture firm of Shepley Bulfinch to assist with development of this framework, focusing on:

- Assessment and documentation of current library space usage at MIT.
- Survey of investments in library resources and space recently undertaken by other premier academic institutions.
- Synthesis of input from the Faculty Committee on the Library System (FCLS), the MIT Library Council and the Public Spaces UX (User Experience) Group.
- Development of Planning Principles to guide future library space initiatives.
- Exploration of the Library’s role in realizing the recommendations of MIT’s Working Group on the Future of Campus Teaching and Learning Spaces.

The result of these efforts is the identification of primary goals and opportunities for development of library space, premised on the need of the MIT Libraries to continue to respond to rapidly shifting modes of information access, teaching, learning, and research, and to continue to remain competitive with peer institutions.
Goals & Opportunities

Engagement with Institute Scholarship and Research

Library space should be developed to strengthen engagement with the surrounding MIT campus, providing opportunities for interaction and collaboration through the inclusion of experimen-
tal teaching labs, flexible event spaces, food and coffee venues, informal meeting areas, and partner academic services.

The concept of "villages of learning," articulated by the Working Group on the Future of Campus Teaching and Learning Spaces, embraces this goal. In development of teaching and learning space within the Libraries, it will be important to tailor resources and activities to the surrounding context of each facility, contributing to the creation of "neighborhood themes," defined by campus location, the surrounding mix of disciplines and activities, and the challenges and opportunities of existing space.

Enhancing User Environments

More robust and varied environments for study and research should be created within the Libraries. These should include group work space with white boards for problem solving and quiet reading rooms for individual work — "alone together". Expansion of safe, clean, coffee-available twenty-four hour study spaces, in support of MIT's "allnighter" culture is desired, as well as the creation of specialty facilities supporting services like GIS, data visualization, and media creation.

Providing Critical Information Resources

MIT's current collections model provides an evolving, integrated balance between online sources and physical materials. Current collection growth strategies support extensive acquisition and use of digital resources, responding to the strong demand by the MIT community for online access to information resources. The Libraries are working to build rich print or tangible collections, which remain the predominant holdings of the MIT Libraries. These collections must be housed and serviced in a manner that meets the needs of all users, both traditional and digital.

This intensive development of current digital collections in STEM fields does not negate the need for rich print or tangible collections, which remain the predominant holdings of the MIT Libraries. These collections must be housed and serviced in a manner that meets the needs of all users, both traditional and digital.

Central Courtyard

The central courtyard should be developed as a central commons space connecting surrounding library and learning environments. It will be the location for informal seating areas and places for collaboration that are essential to successful teaching and learning environments. By blurring the boundaries between library, academic, and commons spaces — specifically by including a café, experimental teaching spaces, labs and event spaces — a holistic environment supporting Institute endeavors will be realized.

Barker:
The integration of the Barker engineering collections with Hayden science and humanities collections will create opportunities for more effective use of Barker. Barker's greatest potential lies in providing open-plan space for individual and group work. In this way, its narrow, windowless, ring-shaped floor plates, can be effectively utilized. Barker's Main Group location, as well as its iconic stone reading room, can be leveraged to create a rich assortment of library-maintained collaborative environments that are small in scale and open 24 hours.

Rotch and Dewey:
Rotch Library, containing Art, Architecture and Planning Collections, and Dewey, focused on Business, Economics, and Political Science collections, should continue to remain as distinct library facilities providing Institute-wide resources, as well as support to the professional degree programs they serve. Rotch Library will benefit from additional study seating, especially collaborative study space with acoustical separation from surrounding areas. Recently renovated, Dewey contains a mix of seating environments that successfully meet Institute needs. Over time, it may be possible to reduce physical collections in both of these facilities to provide additional seating, flexible meeting and instructional space, and technology-enhanced work areas.

Summary

This high-level framework for development of space envisions Hayden-Building 14 as the hub of the library system, providing a rich mix of learning spaces and collections for science, engineering, humanities, music, and archives. The focus of Barker will be 24-hour collaborative and instructional environments maintained by the library, but largely without tangible collections or a traditionally staffed service point. Two specialized facilities meeting the needs of their campus neighborhoods will remain: Rotch, serving architecture, art and planning; and Dewey, serving management, economics, and political science. Such a strategic shift will strengthen the Libraries' ability to support and enhance the academic priorities of the Institute.
MIT Campus Culture & the Library

“The MIT Libraries have never been a traditional research library. The Libraries have long benefited from the experimental and entrepreneurial culture of MIT, and they are known for their innovation and for a willingness to take calculated risks. In comparison with many of their peers, the MIT Libraries are more client focused, more comfortable with technology, and more flexible than many others are able to be.”

- MIT Libraries: Achieving a Desired Future State for 2015

The unique nature of the MIT Libraries and the community they serve has been articulated through dialogue with the faculty and student members of the Faculty Committee on the Library System, the Library Council, the Public Spaces UX Group and the Libraries’ Steering Committee.

Users of the MIT Libraries comprise a complex web of preferences, activities and behaviors. Library environments must recognize multiple tiers of library users and their varying needs for access and support. Stakeholders characterize the MIT community as a culture of problem solving, and emphasize the importance of providing library services, resources and facilities that recognize this “problem-solver” mentality. Cultural attributes identified include:

- Variations by discipline in work space needs of graduate students:
  - Science and engineering: work is primarily research lab-based. Bench space is maximized at the expense of graduate student workspace.
  - Social sciences and humanities graduate students frequently spend long hours in the library and benefit from generously-appointed spaces with maximum hours of service.

Reflective of this context, Planning Principles were developed by the Project Steering Committee to capture overarching goals for the 21st century library at MIT.

Planning Principles

Teaching and Learning: The Libraries will provide a variety of flexible teaching and learning spaces to support MIT students and faculty.

Integration and Interaction: The Libraries will be actively engaged with the MIT community, hosting resources, services, gatherings and events that are connected to the Institute’s activities of research and learning and in step with Institute-wide needs and initiatives.

Information Resources: The Libraries will make digital and physical resources accessible to all members of the MIT community regardless of location, through a seamless, easily navigated system.

Technology and Tools: The Libraries will aggressively deploy technology-rich resources to support information access, and continuously evaluate and refine physical collections in step with user needs and format preferences.

Staff and Services: The Libraries will provide spaces and services that encourage collaboration and facilitate interaction between disciplines, staff, faculty and students.

Environment: The Library’s commitment to creating the next generation research library will be reflected by its physical environments.
Teaching & Learning

The Planning Principles align with the goals set forth by the Working Group on the Future of Campus Teaching and Learning Spaces to define a vision for flexible, integrated and engaged “villages of learning”, providing places for formal and informal exchange of information and ideas.

* The Libraries provide an excellent environment for creating neighborhoods of blended learning spaces that can increase student and faculty productivity. The transition of large amounts of scholarly content to digital form creates an opportunity to reallocate library space to meet growing demands for reflective, quiet study and work; collaborative spaces for group study and work; and flexible teaching spaces. Technology has also created opportunities not only to make these spaces more productive, but also to rethink the deployment of library staff on campus – providing additional opportunity to create student focused learning spaces. With careful design and investment, neighborhoods of proximate spaces that serve a variety of learning and community needs can be realized in current library spaces including:

- Study/learning spaces for both individual and collaborative work
- Flexible teaching spaces with robust technical support
- Access to important scholarly content regardless of format
- Food and beverage
- Technology enabled spaces that provide access to specialized tools, software, and expert help in support of both seamless access to multi-media content, worldwide collaboration, and the creation of new forms of scholarship and research enabled by this wide array of content types and digital tools
- Collaborations with other services such as Writing Across the Curriculum, tutoring services, and IT support

This concept of an academic village builds on the strong tradition of libraries at the heart of the university enterprise.*

* The MIT Working Group on the Future of Teaching and Learning Spaces, Appendix 8; 20 March 2012

As decisions are made that affect space for collections, seating, staff and services, intentional integration of teaching and learning spaces and careful attention to their placement must also occur. Doing so will foster faculty-student interaction and robust collaboration between peers and across disciplines, reinforcing the Libraries contribution to MIT’s educational mission.

Space use strategies for the MIT Libraries must include creation of spaces that support this vision for “villages of learning” as an important component of the services and resources provided by the contemporary academic library.
Any future vision for reimagining the MIT Libraries’ physical spaces must be grounded in an understanding of what is currently provided. In addition to its virtual portal, which serves increasingly as the integrated “door” to collections and services, departmental librarian liaisons are a key service interface. The libraries also maintain four primary physical facilities on campus.

The analysis on the following pages highlights resources and space provided by the libraries, and identifies challenges and opportunities inherent in each space.

- Barker (Engineering)
- Dewey (Management, Economics and Political Science)
- Hayden (Science and Humanities, Lewis Music, Institute Archives & Special Collections)
- Rotch (Architecture and Planning)

Each of these facilities provides services and workspace for Institute-wide use. Strategies for redevelopment of any of these facilities must take into consideration Institute priorities and frameworks for overall development of library and teaching and learning spaces on campus.

Beyond the main libraries, several supporting facilities are also maintained. The Stata Center, in addition to containing specialized shelving, also houses a small public presence - the Information intersection - which was designed to promote awareness of library resources campus-wide. The Library Storage Annex, a large closed - stack facility located near the intersection of Massachusetts Avenue and Main Street, northwest of the main campus, includes a small reading room for in-person use by appointment. Its primary function is to house print volumes for quick scanning and online delivery to users.

Academic Media Production Services, which is part of the MIT Libraries, provides video production and distance education support for the Institute. Its facilities - including Level-5 video capture classrooms, server and control rooms, a production studio, dubbing suites, equipment storage, and staff work areas - are dispersed in five locations across campus, including some leased space in Technology Square.

In total, the four primary libraries; Hayden, Barker, Dewey and Rotch, provide approximately 149,400 assignable square feet (asf) of usable space, as summarized in the space allocation chart on page 11 of this report. Hayden is the largest library, providing 77,816 asf of space. Barker, Dewey and Rotch are all similar in size. Collections held within these campus libraries are fairly evenly distributed, and comprise 57% of MIT’s total physical collections. Hayden (44%) contains the majority of user seating areas.

Over the last 30 years, the library has benefitted from a series of small renovation projects, the most significant being 2003 renovations to Hayden Library to create the Wunsch Preservation Center, the 24-hour study and service desk area, and the new reading room and staff spaces in the Archives. In 2010 there was a comprehensive renovation of Dewey Library.

Overall, many of the physical spaces within the libraries reflect mid to late 20th century models for accessing and using information, and do not meet user demands for the technology-rich, flexible study and learning spaces that define a 21st century academic library.
MIT Libraries Location Plan

- **Library Storage Annex**
  - MAIN STREET
  - MASSACHUSETTS AVE
  - MEMORIAL DRIVE
  - AMHERST ST.
  - ALBANY ST.
  - VASSAR ST.
  - STATA CENTER
  - IT HUB FOR DIGITAL LIBRARY

- **Rotch Library**

- **Barker Library**

- **Hayden Library**

- **Dewey Library**

**AMPS locations:**
- Lecture Video Capture
- Technology Enabled Classrooms
- Video Conferencing, TechTV
- Video Recording Studio

**Hayden Library:**
- 14N - Institute Archives & Special Collections
- 14E - Lewis Music Library
- 14S - Humanities and Science Library
Space Allocation Patterns

In comparison to typical space allocation patterns within academic libraries built throughout the 20th century, MIT already assigns proportionally less of its on-campus space to physical collections, and is continuing to reduce it further. While a typical late 20th century academic library might have allocated 50% of library space for collections, 25% for staff, and 25% for user spaces, the MIT campus libraries accessed by users (Hayden, Barker, Dewey and Rotch), currently use 43% of space for collections, 23% for staff and 34% for user spaces. These norms are rough ranges in which variation between institutions and their individual facilities is broad. MIT’s variance from these norms reflects the Libraries’ aggressive investments in electronic information formats in STEM disciplines. The nature of MIT collections is discussed further on pages 18-19 of this report.

Library Seating

The MIT Libraries currently provide approximately 1,270 seats for users, occupying approximately 43,798 asf. Overall, this provides 35 sf / seat, in comparison to best practice standards for library seating of 30-45 sf / seat.

Current seating areas for study and instruction will accommodate 13% of MIT students, based on a full time enrollment (FTE) of 10,376 undergraduate and graduate students. Recognizing that many of MIT’s graduate students (science, engineering, architecture) work primarily in lab spaces, the current amount of individual study space may be adequate in quantity. It should be noted, however, that the seat count is less than that of other private research university libraries, some of which are providing seating for 20-30% of students within the libraries.

In compiling this analysis, the lack of group work space in Hayden and Rotch, the lack of food and coffee venues in or near library study areas, and the limited amount of 24-hour study space within the libraries were noted as deficiencies by MIT stakeholders. Designated group study areas currently represent 15% of total user seating, with the majority located in recently renovated areas of Barker and Dewey. Hayden and Rotch each designate only 7% of their seating for group use.

Teaching and Learning Spaces

Currently, only 2% of library space is allocated for instructional, training or digital labs. Space allocated for these services will be expanded through integration of more teaching and learning functions as the recommendations of the Working Group on Teaching and Learning are implemented.

The lack of flexible space for instruction, meetings and events within the libraries is notable in comparison to many premier academic libraries, and may hinder the engagement of the Institute with the rich resources and services the libraries provide.

Summary

Recently, many academic Libraries have incorporated teaching and learning spaces and enhanced user seating by reducing the amount of space devoted to print collections. Given the relatively modest proportion of space already used for physical collections within the MIT Libraries, the Institute, in addition to evaluating further tactics for shrinking the footprint of physical collections, may also explore strategies such as shifting more library support functions out of the main campus libraries, and creating “villages of learning” through the acquisition of additional space adjacent to, and integrated with, the libraries’ current spaces.

Data on page 11 of this report. Note: Excludes space located in AMPS, Building E25, Library Storage Annex and Stata Center.

Campus Libraries Existing Space Allocation (in Hayden, Barker, Dewey, Rotch)

<table>
<thead>
<tr>
<th>PUBLIC/SOCIAL SPACES</th>
<th>INSTRUCTIONAL SPACES/RESOURCE DIGITAL LAB</th>
<th>STAFF</th>
<th>USER SEATING</th>
<th>COLLECTIONS</th>
<th>FACILITY SUPPORT</th>
<th>SPECIAL COLLECTIONS/FACILITY ARCHIVES</th>
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Data on page 11 of this report. Note: Excludes space located in AMPS, Building E25, Library Storage Annex and Stata Center.
**Library Space Inventory**

### Existing Space Allocation Summary

<table>
<thead>
<tr>
<th></th>
<th>BARKER (Engineering)</th>
<th>DEWEY (Arts &amp; Social Sciences)</th>
<th>HAYDEN BUILDING</th>
<th>Institute Archives &amp; Special Collections (IASP)</th>
<th>Lewis (Music)</th>
<th>TOTAL</th>
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<td><strong>Existing Space</strong></td>
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**General Program**

- Public/ Social Spaces: 300 sf, 420 sf
- Service Points: 480 sf, 1,614 sf
- User Seating: 242 seats, 9,031 sf
- Facility Support: 136 sf, 440 sf
- Instructional Space: 6 seats, 461 sf
- Collections (Distribution of stack space): 11,259 sf, 15 seats, 712 sf
- Staff Workplace: 3,002 sf, 22 seats

**Program Breakdown**

- **Hayden EXCEPT Lewis and IASC**
  - Hayden: 81 seats, 2,872 sf
  - Lewis: 12 seats, 678 sf
  - IASC: 15 seats, 1,287 sf
- **Hayden EXCEPT Lewis and IASC*** (All Libraries Above)
  - Hayden-Building 14: 210,000 sf
  - Lewis: 13 seats, 3,963 sf
  - IASC: 13 seats, 3,002 sf
- **Hayden-Building 14**
  - Hayden: 281 seats, 14,799 sf
  - Lewis: 12 seats, 678 sf
- **Rotch (Aff) & Storage**
  - Rotch: 4,393 sf
- **Institute Archives & Special Collections (IASC)**
  - IASC: 1,956 sf
- **Library Storage Annex (N57)**
  - N57: 1,956 sf

**Total Library Space**

- Total of General Program per Library (SF): 28,743 sf
- Total of Library System (Libraries Above + E25, Stata Center, Annex): 189,329 sf

### Points of Note

- **Total Staff in Location**
  - A: Administrative and support services which do not require Hayden location
  - ON: On-site responsibilities which require Hayden location (primarily IDLA, IRS, CSM, IASC & CPS): 64

- **Total Staff in Location**
  - Total of General Program: 28,743 sf
  - Total Staff: 168
  - Total Staff in Location: 190,000 sf

- **Number of Staff per Location**
  - *Staff who provide administrative and support services, as opposed to having on-site responsibilities, account for a substantial number of Hayden staff. This is a rough estimate of the groups and numbers in those two categories for Hayden.*

- **Library System**
  - Total Staff: 148,219 sf
  - Total Staff in Location: 149,319 sf
  - **Total of General Program (Libraries Above)**
    - Total Staff: 164,067 sf
  - **Total of Library System**
    - Total Staff: 34,067 sf

- **Total of Library System (Libraries Above + E25, Stata Center, Annex)**
  - Total Staff: 189,329 sf

- **In total, the Libraries occupy 189,329 sf. Excluding annex collection storage and support services, the campus libraries accessed by users (Hayden, Lewis, Barker, Rotch and Dewey) occupy 149,319 sf, 79% of the total assignable area.**

- **Within the campus libraries (Hayden, Barker, Dewey and Rotch), stacks occupy 43% of the total area, and user spaces occupy 34%.**

- **The libraries provide 1,342 user seats for study and instruction, which would accommodate 13% of MIT’s student enrollment (10,376, Fall 2011).**

- **User seating averages 35sf/seat. Best practice in contemporary academic libraries is to provide 30-45 asf per seat.**

- **In contrast to facilities of many of MIT’s peers, the libraries do not include venues for food or for social-intellectual gatherings and events.**

- **In 2012, the library system occupies approximately 11,000 asf less than in 2004. The change results from the closing of the Aero/Astro, Lindgren and Rotch Visual Collection libraries.**

- **In 2012, libraries store approximately 220,000 fewer physical volumes in user accessed libraries than in 1999. The decline has been gradual, as more physical collections are shifted to off-campus repositories.**

- **Of physical collections shelved off-site, 80% are housed in remote storage in the Harvard Depository and 20% in MIT’s Library Storage Annex (N57).**

- **Of the staff located in Hayden Library, approximately 43% (48 staff) are providing administrative and support services that do not require a Hayden location.**
Hayden Library (Science & Humanities, Institute Archives & Special Collections)

Hayden Library
The largest of the MIT Libraries, Hayden currently houses the science and humanities collections on the south side along the river, the Lewis Music Library on the east side, and the Institute Archives & Special Collections (IASC) on the north side. Also on the north side are the Malhausen Gallery, offering exhibits from the IASC and other library collections, and the Digital Instruction Resource Center (DIRC), the Hayden Library’s only instruction facility. These library functions are adjacent to Killian Hall, a medium-sized lecture, rehearsal and concert space which is assigned to the School of Humanities and Social Sciences (SHASS) and heavily used. Remaining spaces in Building 14 house SHASS faculty offices and classrooms, the Writing Program, and the Women and the Gender Studies Program. The library currently occupies 80% of the 97,722 sq ft available in Building 14.

Challenges:
- Most areas of Hayden appear tired and worn. Extensive infrastructure improvements to address outdated building systems and access challenges are needed.
- The mezzanine levels on floors one and two create access and orientation difficulties for users.
- The facility lacks adequate spaces for group work, flexible spaces to support instruction within the library, and technology-enabled spaces providing access to specialized tools and resources. In this respect, it falls far short of the types of spaces expected in a contemporary library serving the sciences and humanities.
- The current 24 hour study area is heavily used, but inadequate in size to meet demand.
- Basement level staff areas, with the exception of the recently renovated Wunsch Preservation Lab, consist of outmoded work spaces that offer makeshift quarters for critical library operations.

Opportunities:
- The large floor plates, high ceilings, and daylit reading rooms with river views provide many opportunities for interior revitalization.
- Library stakeholders place a high priority on integration of Barker’s engineering collections with the Hayden science and humanities collections. This will trigger a rethinking of Hayden space allocation and collection management models.
- Enclosure of the Lipchitz Courtyard, in the center of Building 14, would create a common space for learning and interaction without displacing SHASS program spaces housed within Building 14.
- Further integration of historical archival collections into the learning and research programs of the Institute.

In considering the relationship of Hayden Library to surrounding spaces within Building 14, including Killian Hall and the uncovered interior courtyard, there may be opportunities to make the flow between these areas more seamless, creating a more permeable perimeter to Hayden Library and providing a central collector space for these interrelated teaching and learning components by enclosing the courtyard.

Such a vision is articulated further in the Report of the Working Group on the Future of Campus Teaching and Learning Spaces, March 2012:

“The most immediate opportunity for transforming library space to incorporate the learning commons concept may be within the footprint of Building 14, leveraging the existing Hayden Library. The concept of a Building 14 academic village also holds promise for establishing a classroom complex with a focus on supporting the pedagogical strategies and experimentation employed for the Communication and Humanities, Arts, and Social Science General Institute Requirements.”
Hayden Library (Science & Humanities, Institute Archives & Special Collections)

Existing Space Distribution per Floor

**Space Distribution per Percentage**

- **Assignable Square Feet:** 71,731 asf. (excludes Lewis Library)
  - Science & Humanities Library: 68,330 asf.
  - Inst. Archives & Special Collections: 3,401 asf.
- **Number of User Seats:** 493 seats
- **Number of Staff:** 108 persons
- **Volumes of Collection:** 607,501 vols

24/7 Study

2nd Floor Study/Stacks
The Lewis Music Library provides materials that support the music curriculum and serve the reference, research, and recreational needs of the MIT community. The collection includes books, journals, scores and recordings. Located in Building 14, adjacent to the science and humanities collections, Lewis maintains its own service desk, and provides quiet study areas, listening facilities, electronic keyboards and music composition software. Renovated in 1996, the interior environment is highly valued by its users.

Challenges:
- The library provides only limited seating and maintains no direct connectivity to science and humanities collections, providing a discontinuity of service for some users.

Opportunities:
- Within Building 14, the Lewis Library is centrally located on campus and adjacent to Walker, which is slated for renovation to provide music performance and practice spaces.
- Through the development of Hayden Library as a more permeable facility, connected with other Building 14 academic programs to create a “village of learning”, the opportunity exists to strengthen connections between Killian Hall, Hayden Library and Lewis Library, and to provide more group and individual study spaces to support use of music resources.
Barker Library (Engineering)

Existing Space Distribution per Floor

- **PUBLIC/SOCIAL SPACES**
- **INSTRUCTIONAL SPACES/RESOURCE DIGITAL LAB**
- **SERVICE DESK**
- **USER SEATING**
- **STAFF**
- **COLLECTIONS**
- **FACILITY SUPPORT**
- **SPECIAL COLLECTIONS/FACILITY ARCHIVES**

**Space Distribution per Percentage**

- Assignable Square Feet: 24,749 asf.
- Number of User Seats: 242 seats
- Number of Staff: 13 persons
- Volumes of Collection: 274,083 vols

Barker Engineering Library provides information to serve the teaching and research needs of the School of Engineering and all other instructional and research programs of the Institute that require materials in the engineering disciplines. Barker Library is located in Building 10, occupying levels 5-8, with some library staff located on level 4.

**Challenges:**
- The main lobby/service point and seating areas on level 5 surrounding the main reading room are limited by the narrow, curved configuration of the existing space.
- The upper floors surrounding the dome, levels 6-8, are remote from campus activity, and are limited by lack of day light and an inefficient “doughnut” footprint.
- There are no restroom facilities within the library on level 5, which provides the largest amount of seating.

**Opportunities:**
- The main reading room, under the Great Dome, is an iconic space and a favorite library study environment. It is also used for Institute events. With the addition of restrooms and a separate entrance, this space would be suitable for extended hours study.
- Level 8 has recently been converted into group study space, and is popular with students. Print collections are being steadily reduced, providing opportunities for creation of additional study space. Eventually, when all collections are shifted out of the library, it could be repurposed as a series of library-maintained collaborative environments that are small in scale and suitable to an open plan layout.
- Level 4 of Barker provides a more regularized floor plan and access to natural light. This area is suitable for continued use as staff space, as well as a central location for teaching and learning facilities supporting multiple disciplines, such as the Library’s proposed Geographic Information Systems and Data Visualization Learning Lab.
Dewey Library (Management & Social Sciences)

**Existing Space Distribution per Floor**

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2010 - Total Renovation of all 3 floors

Dewey is the primary library for MIT’s Sloan School of management, the Department of Economics, and the Department of Political Science. Dewey was completely renovated in 2010, the most recent significant renovation project undertaken in the Libraries. The library occupies a portion of the Basement, and Levels 1 and 2 of Building E53. It provides the most current and technology-rich library user space on campus, including a series of group study rooms, technology-equipped areas, and pleasant, open seating environments.

**Challenges:**

- Basement study space is currently underutilized.

**Opportunities:**

- If underutilization of basement study space continues, consider partial conversion of carrel space to a flexible classroom-style teaching space similar to the DIRC (in Hayden) for hands-on instruction or other alternative programming.
- In the long term, the library might consider removal of some compact shelving to create additional seating areas or to meet other library needs.

**Space Distribution per Percentage**

- Assignable Square Feet: 26,956 sf
- Number of User Seats: 291 seats
- Number of Staff: 11 persons
- Volumes of Collection: 477,566 vols

Service Point

Seating/Study Area
The Rotch Library of Architecture and Planning provides print collections to support art, architecture, and planning. Also included in Rotch Library are the Aga Khan Documentation Center, supporting teaching and research of architecture in Islamic societies, as well as map and visual collections, special collections pertaining to the fields of architecture and planning, and a small GIS Lab. The current facility, located in Building 7, was renovated in 1991, and is heavily used not only by the architecture and planning departments, but as a popular study space by a cross-section of students.

Challenges:
- The structural stack tiers provide highly efficient storage for print collections, but would be difficult to convert to other functions.
- The split floor levels between Buildings 7 and 7a add complexity to repurposing of spaces for new uses.
- Lack of enclosed group study space creates noise conflicts within the library.
- The library has limited options for adding specialized labs or other teaching and learning spaces due to its physical layout.

Opportunities:
- The library provides pleasant, day-lit, user space in its main reading room.
- Its architecture is a campus landmark.
- The stacks provide browsable, yet highly efficient print collection storage.
- The Level 1 space currently being utilized for digitization of the slide collection is suitable for repurposing for a variety of needs once this project is completed. The library has identified portions of this space as suitable for housing the Aga Khan Documentation Center staff and activities, adjacent to the Aga Khan Visual Archive.
In analyzing collection accommodation for the MIT Libraries, the current balance between digital and physical collections, as well as projected trends in collection acquisition, must be considered.

Since the early 1990's, the MIT Libraries have aggressively developed collections in electronic format, including journals, databases and e-books. The Libraries' current collection policy provides an integrated balance of digital and physical materials, with the pace of shift to electronic reflecting the readiness of the disciplines, the availability of products and services, and the required financial and staff resources.

Over the past decade, expenditures for electronic resources have increased dramatically. In 2011, 91% of the acquisitions budget was allocated for electronic resources, compared with only 24% in 2002. Collaborative arrangements with peer research libraries are expanding MIT's access to print-only materials and reducing the need for permanent acquisition of lesser-used materials. Three notable examples include Borrow Direct, which features user-initiated borrowing from partner institutions, expanded reciprocal agreements with the Harvard Libraries, and the shared resources of the HathiTrust (an institutional partnership for access and preservation of digital content). Still, MIT's physical collections, including 2,383,054 print volumes of monographs, journals and serials, continue to represent the majority of the MIT Libraries' information resource holdings and are essential to participation in collection-sharing agreements. Of those print materials, 57% are held on campus in the Barker, Dewey, Hayden and Retch Libraries, and nearly half are in Hayden alone. Of the 43% shelved off-site, 20% are in the Library Storage Annex (Building N57) and 80% are in the Harvard Depository (Southborough).

Library shelf capacities above 85% do not allow for appropriate maintenance of collections. With this in mind, Hayden, Barker and Dewey are currently at, or already exceeding, their appropriate capacity. Measures that would allow for the eventual consolidation of Barker Engineering materials within Hayden include continuing to adjust the digital-print resource acquisition mix to respond to the needs of users, and increasing the percentage of print materials shelved off-site in the Library Storage Annex and in the Harvard Depository.

Current Collections Distribution
Expenditures for Information Resources

Peer Collection Distribution

Trendline for Collections Storage
Premier academic institutions continue to invest in their physical library spaces, recognizing their libraries as essential to supporting academic mission and strategic initiatives.

Contemporary academic libraries, as well as models for a desired future state, remain highly specific to each institution’s goals, resources and existing organizational and facilities structure. This makes statistical comparisons for benchmarking purposes difficult to achieve. More helpful are qualitative surveys that identify successful environments, activities and experiences in new or recently renovated academic libraries.

The library survey included review of library attributes for several Universities with strong science and technology programs. Data was not readily available to develop consistent analysis across a wide group of peers, but in general, when compared to Georgia Tech, Purdue University and Stanford, MIT stores a greater proportion of print collections off-site, and includes fewer teaching and learning, and group workspaces within their libraries.

A survey of recent projects undertaken to improve library spaces identified a series of initiatives undertaken by premier academic institutions that have enhanced user experience, increased campus engagement with the libraries, and supported innovative partnerships and programs in teaching, learning and research.

Most relevant to the MIT Libraries were the following projects:

**Georgia Tech University**

The University Library East Commons Renovations and Clough Learning Commons Addition were created to enhance student success and build synergies between library, teaching lab and academic support services. The East Commons Renovations were undertaken in 2006, as part of a series of renovations spanning from 2002 to 2009 to create technology-rich individual and group study spaces within the library. A café is included in the renovated space. The 230,000 square foot Clough Learning Commons addition opened in fall of 2011. Connected to the library it provides classroom and laboratory space for first year science courses, combined with exhibit and event space, a café, academic and technology support services, and group work areas.

**Duke University**

The Link, Teaching and Learning Center, opened in August, 2008, was created in a partnership among Duke University’s Perkins Library, the Office of Information Technology and the College of Arts and Sciences. Located on the lower level of Perkins Library, the facility offers innovative spatial and technological approaches to teaching and learning. It includes a service desk staffed with instructional technologists, flexible teaching and group work spaces and informal study areas.
Johns Hopkins University
The new Brody Learning Commons adds a 40,000 square foot wing to the University’s 185,000 square foot Eisenhower Library. Opening in fall of 2012, the new addition will emphasize enhancement of the user experience within the library, providing 500 additional library study seats. A collection of formal and informal reading rooms, a café, and experimental classrooms are complemented by new special collections reading and instructional space and a conservation lab.

Columbia University
The new 13,000 square foot Science and Engineering Library is located in the Northwest Corner Building, adjacent to research labs, a lecture hall and a café. It is notable for its attention to user environments to support focused individual work with technology, group seating in booths and informal reading areas. The Library’s Digital Science Center includes high-end computers specially equipped with software and hardware to support teaching, learning, and research in the science and engineering disciplines.

North Carolina State University
The Hunt Library is the primary component of a 220,000 square foot facility being constructed to support research and development on NC State’s Centennial Campus. Scheduled to open in fall of 2012, the Library will include a café, gallery, digital studios and visualization labs to foster interaction and exchange of ideas in an interdisciplinary environment. Collections will be accommodated in an automated robotic retrieval system. The Hunt Library will share the facility with the Institute for Emerging Issues, a public policy “think-and-do” tank that brings together leaders from businesses, non-profit organizations, government, and higher education.

Stanford University
The Terman Engineering Library, opened in 2010 within the Hen-Hsun School of Engineering Center, emphasizes the creation of user spaces to foster interaction and collaboration. The library maintains a relatively small print collection of 10,000 volumes and 100 journal titles to supplement robust electronic collections. The library’s long-term strategy is to convert all engineering collections to electronic format.

The following pages include images and information about each project. While no single project represents an ideal model for MIT, the examples illustrate a continuum of emphasis on integration of teaching and learning spaces, and enhanced user environments that correspond with the goals identified by MIT Libraries, as well as those included in recommendations of MIT’s Working Group on the Future of Campus Teaching and Learning Spaces.
Case Studies, Teaching & Learning

Georgia Tech
- Total Enrollment: 19,432
- Total Number of Libraries: 3
- Total Volumes of Collection: 2,556,729

Clough Undergraduate Learning Commons
- Located in the heart of Georgia Tech’s campus
- Integrated with and connected to the library
- Open to students, staff and faculty 24/7
- One of 12 LEED-rated building’s on Tech’s campus

Seating:
- 2,100 seats
- Reservable group study rooms (24/7)
- 41 Classrooms (science labs)

Services:
- Centralized tutoring, advising and academic support
- Writing and communications lab
- Computer and technology support
- 30 exhibit spaces, including a gallery
- Presentation rehearsal Studios
- Starbucks Cafe

Library East Commons
- Mixed-use, flexible space designed for long-term collaborative work and academic socializing

Services:
- Group Computing
- Performance Space
- Exhibits

Collections:
- Over 2.5 million volumes and access to over 91,000 e-Books and 26,000 e-Journals
- The Georgia Tech Archives maintains a 4,332 volume Rare Book Collection, as well as a 12,000 volume Science Fiction Collection.
- SMARTech, the institutional repository has over 33,500 items including more than 15,000 Georgia Tech theses and dissertations.

www.gatech.edu
Case Studies, Teaching & Learning

Duke University

- Total Enrollment: 14,746
- Total Number of Libraries: 8
- Total Volumes of Collection: 6,172,205

Link (25,000 sf. on Lower Level of Perkins Library)

The Link is a lab that expands the boundaries of the physical classroom, facilitating education in a flexible, collaborative setting rich with new media technology close to library resources.

Seating:
- 6 Classrooms: 5 with seating for 20 to 30 people, 1 with seating for 40 people
- 4 Seminar Rooms, 11 Group Study Spaces equipped with state-of-the-art audio/visual systems
- Numerous informal spaces for individual and collaborative work

Services:
- Main University IT Help Desk
- Managed by Off and Arts & Sciences
- Media wall at the Link entrance helps define the space and promotes technology as a valuable tool

link.duke.edu

Study Space

Help Desk

Group Study

Classroom

Multi-Use Surface

Study Space

Study Space

Help Desk
Case Studies, Student Experience

Johns Hopkins University
- Total Enrollment: 21,410
- Total Number of Libraries: 5
- Total Volumes of Collection: 3,701,215

Brody Learning Commons
(Addition to Eisenhower Library)
(40,000 sf.)

The Brody Learning Commons addition to the Milton S. Eisenhower Library creates a network of intellectual gathering spaces such as a café, destination reading rooms, and collaborative work areas to support a variety of study and research styles. Flexible instructional spaces provide access to robust technology and the new preservation lab is designed to integrate the role of scientists into the field of paper and manuscript conservation.

Seating:
- Spaces for teaching, learning, and collaboration
  - Group study rooms, Reading rooms, Seminar rooms, Technology laboratories (600 seats)
- Café - seats 75

Services:
- A robust wireless network throughout the building

www.library.jhu.edu/yrBLCspace/about.html

Site Plan
Main Level Floor Plan
Exterior View
Learning Commons
Building Section North - South
Case Studies, Student Experience

Columbia University
- Total Enrollment: 27,606
- Total Number of Libraries: 21
- Total Volumes of Collection: 10,264,725

NorthWest Corner Building
(188,000 sf)

Science and Engineering Library
(13,000 sf)
The state of the art building links the laboratories and study spaces to the Columbia campus, facilitating the ready sharing and exchange of ideas, resources and information. Research support for the fields of chemistry, biology, physics, astronomy, and psychology, as well as providing a collaborative environment supporting rapidly expanding interdisciplinary science and engineering research.

Seating:
- Seating and study spaces for 345 students and researchers

Services:
- Digital Science Center: individual and collaborative computer workstations, presentation practice rooms, and instructional space.
- Workshops
- Consultations
- ILL & Borrow Direct (quick delivery from Brown, Cornell, Yale, etc.)
- Course Reserves Access

library.columbia.edu/content/libraryweb/indiv/sciencelib.html
North Carolina State University
- Total Enrollment: 34,767
- Total Number of Libraries: 6
- Total Volumes of Collection: 3,567,234

Hunt Library
(220,000 sf.)

Defining the Research Library of the Future
The Hunt Library enables and encourages experimentation, supports technology-intensive projects, and builds community by showcasing research on campus.

An iconic space filled with:
- technology-enabled furniture
- dramatic video walls
- 3D computing and visualization space
- videoconferencing and telepresence facilities

Robot-driven bookBot automated book delivery system will deliver books in minutes with a click in the virtual catalog. Visitors can watch the bookBot in action through a glass wall on the first floor. The bookBot holds up to 2 million volumes in 1/9 the space of conventional shelving, allowing budget to be redirected to support great study spaces and technology instead.

Seating:
- 100 reserveable group study rooms

Services:
- Creativity Studio - a high-tech space that can be easily reconfigured and transformed to support the particular teaching, learning, and collaborative activities needed on any given day
- Teaching and Visualization Lab - an area with the technology to create a 3D immersive "virtual reality" experience with projection on three or four sides

www.lib.ncsu.edu/huntlibrary
Case Studies, Collections

Stanford University

Terman Engineering Library

The new Engineering Library is a major element within the Jen-Hsun Huang School of Engineering Center - a forward-looking facility that reflects the preeminent reputation of the Stanford School of Engineering. The purpose of this facility, its services and its collections, is to provide an environment for information discovery, utilization, creation, and management.

The Library space and services are designed to foster collaboration among students and faculty, support discovery, retrieval and integration of print and digital information and provide a comfortable ambience with abundant natural light for student and faculty study.

Collections:
- 10,500 print books + 55,000 e-books
- 100 print journals
- 12,000 e-journal subscriptions
- Access to digital collections from professional societies
- Growing online collection of industry standards
- Special Collections (4)

Seating:
- 68 total seats - (15 study tables, 15 study carrels, 6 arm chairs, 2 study booths, 4 public kiosks, 8 computers)

Services:
- 4 subject specialists assigned as department liaisons
- Digital Bulletin Board
- Circulating e-readers (Kindle, Kindle DX, Sony Touch)
- RFID system for book self-check out
- Iphone for reference
- "Gadget Bar" with iPad, Xoom and color Nook for in library use

lib.stanford.edu/englib

Zone A
- Study Carrels
- Self Seating/Reading Areas
- Study Booth
- Books: ENG/CS/Physics
- High and Low Book Stacks

Zone B
- Soft Seating/Reading Areas
- Stand-Up Kiosks at Stacks
- 2 Brainstorming Islands
- Group Study Tables

Zone C
- Circulation Counter
- Self Checkout
- Photocopier
- 2 Printer Stations
- Digital Bulletin Board
- Interactive Display
- Digital Bulletin Board
- Display Case
- Staff Offices & Workspace

Library Floor Plan

Terman Engineering Library

Computer Cluster
Movable Study Tables
Circulation Desk with Self-Check Station
Steering Committee

Project oversight and guidance was provided by a Steering Committee. The Steering Committee met 6 times from September through April of 2012. The Steering Committee included the following members:

MIT:
- Ann Wolpert, Director - Libraries
- Steve Gass, Associate Director for Research and Instructional Services - Libraries
- Diane Geraci, Associate Director for Information Resources - Libraries
- Keith Glavash, Associate Director for Administration - Libraries
- Tito Sierra, Associate Director for Technology - Libraries
- Robert Boes, Senior Planner - Campus Planning and Design

Shepley Bulfinch:
- Carole Wedge
- Janette Blackburn
- Tom Kearns
- Siiri Julianus

Stakeholders

Faculty Committee on the Library System (FCLS):
- Faculty: Chair - Janet Conrad (Physics), Sang-Gook Kim (Mech Eng), Nick Montfort (Writing), Anne Spirn (Urban Studies), Eric Von Hippel (Mngt), Markus Zahn (EE/CS)
- Assistant Provost: Doreen Morris
- Head of IS&T: Marilyn Smith
- Students: Hirokazu Miyaki, Mari Miyachi, Omair Saadat
- Wolpert, Gass, Geraci

Library Council:
- Dept. Heads: Nina Davis-Millis, Tracy Gabridge, Millicent Gaskell, Nicole Hennig, Nancy McGovern, Marilyn McSweeney, Deb Morley, Christine Quirion, Richard Rodgers, Tom Rosko, Howard Silver (in addition to Director & Assoc. Directors)

Public Spaces UX (User Experience) Group:
- Nicole Hennig, Keith Glavash, Stephanie Hartman, Millicent Gaskell, Lisa Sweeney, Anita Perkins, Maria Rodrigues, Cassandra Fox

Resources

Nugent PPT file of Mar 2007 presentation on options for an expanded and renovated Hayden Library


Summary of 2004 ESL Document (pages 1-19)


Locations of Print Collections FY11* as of June 30, 2011

MIT Libraries Annual Report to the President 2010-2011

2011 Space Study [Draft - 07/06/2011]

SWOT Analysis of MIT Libraries Physical Spaces PSUX - Fall 2011

Athena Working Group – Phase 1 Report - May, 2010

ESH libraries 032207

FY2012 CRSP Requests – MIT Libraries (January 2011)


MIT Libraries – Space Projects since 2000

Working Group on the Future of Campus Teaching and Learning Spaces: Phase I - Draft 03/04/11

MIT Libraries – Total Shelf Feet by Location

Teaching & Learning: MIT Study Spaces

