



# NLM NEWSLINE

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## Libraries in the Digital Age

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*What is the role of the library in the 21<sup>st</sup> century? What roles will computers and books play as libraries reinvent themselves as knowledge management centers? What will these new physical and virtual information hubs look like? What exciting models already exist and what lessons do these teach?*

A robust renaissance is underway in the world of libraries and, with this special issue of NEWSLINE, we give you a ring-side seat. We examine the questions above and many more, culling information from the proceedings of "The Library as Place," a symposium held at the National Library of Medicine, Bethesda, Maryland, November 5-6, 2003.



NLM's planned new building (right) embodies many of the interesting new functions and roles characterizing libraries in the 21<sup>st</sup> century

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Cosponsored by NLM and the Association of Academic Health Sciences Libraries (AAHSL), the event featured presenters from the realms of academia, the library community, industry, research laboratories and architecture. Organizers of the symposium for NLM were Becky J. Lyon, Deputy Associate Director for Library Operations, and Susan P. Buyer, Chief, Office of Planning and Analysis. Members of the organizing committee for AAHSL were Rick Forsman, University of Colorado, David Ginn, Boston University and Logan Ludwig, Loyola University.

A DVD version of the "Library as Place" symposium is now available for a \$10 shipping and handling fee from AAHSL. The next best thing to being there, this easily searchable product is innovative, interactive, multi-windowed and complete. Employing either visual reference or text search tools, users of this DVD can go immediately to any point in the two-day conference to view videos of presenters in one window, simultaneously bring up the accompanying visuals in a second "zoom window" (to expand their size), and in a third, scroll through a "thumbnail" set of the entire presentation, select one slide and have both the video and "zoom" windows move to that exact point in the presentation.

English-language captioning of the conference's 13 total hours of video is provided, as is a five-minute introductory "highlights" video. Other firsts include video interviews with the conference's 19 poster presenters and digital photographs of their posters, plus biographies of all presenters and interviews with several of them.

To obtain a copy, go to [www.aahsl.org](http://www.aahsl.org).

# SUMMARY

In the Internet age, the bricks-and-mortar library may seem a quaint throwback to earlier days.

However, while libraries appear unchanged to some, inside they are undergoing a dramatic transformation to merge the digital and print ages.

In 2002, according to researchers at the University of California at Berkeley, five billion gigabytes of new information are generated annually—the equivalent of 37,000 Libraries of Congress-sized book collections! Even if Andrew Carnegie and Bill Gates, the world's two richest men of their eras, could magically pool their resources, they could never build enough libraries quickly enough to keep pace with today's information explosion.

Fortunately, the traditional free library, called by Carnegie "the cradle of democracy," has not been left in cyber dust. Americans made 1.1 billion visits to the nation's 140,000 libraries in 2002, confirming what former president of the New York Public Library Vartan Gregorian has termed their "unsurpassed importance as a civic institution."

Rather than fading away, libraries are undergoing a robust renaissance, accommodating computers, wired and wireless, and books in exciting new ways "to connect learning communities in and across space," as library design expert Shirley Dugdale, with the international design firm DEGW, observes.

While reinventing themselves as knowledge management centers, to better serve a fast-paced consumer culture, libraries continue to demonstrate their value as engines of growth, annually channeling about \$14 billion into the economy.

For example, there are more than 203,000 librarians in the U.S. (more than architects and pharmacists combined), annually contributing some 422 million hours of professional service. Surveys show that for every tax dollar invested in them, public libraries return more than a dollar's worth of benefits, reaching as high as \$10 per tax dollar for the Phoenix, Arizona public library.

New libraries are under construction and old ones undergoing renovation across the country, on college and university campuses large and small, from rural regional centers to the biggest cities. Along the way, "There is a redefinition of user space to better serve library staff and user needs while fostering collaboration and community," says Sarah Thomas, Carl A. Kroch University Librarian at Cornell University.

When it opens in 2006, a new \$35 million biomedical library will be the "signature" building for an ambitious, multi-year, \$1.3 billion public-private project that will expand the University of Colorado Health Sciences Center (UCHSC) from its current, cramped 46-acre Denver campus to a new, 217-acre facility at the former Fitzsimons Army Medical Base, in nearby Aurora. As a hub of knowledge and data transfer, UCHSC library director Rick Forsman notes

that the new library will link people, trustworthy biomedical knowledge and technology to foster learning, provide the latest research, promote interaction and improve health care.

Although building a library from scratch is every librarian's dream, renovation and expansion of existing facilities are more common—and perhaps most challenging. During a "stem to stern" renovation of the University of North Carolina at Chapel Hill Health Sciences Library in 2002, director Carol Jenkins noted wryly that the motto was, "Open for renovation, prepared for aggravation."

Jenkins and her team identified user needs through extensive focus group research and set goals that redefined what a library was and how it could serve its patrons. The North Carolina Health Sciences Library will be a physical and virtual information hub, presenting an inviting, comfortable "human" space with lots of color. It will offer a range of functional work spaces for users and staff, be flexible enough to meet changing needs, and connect people and knowledge through comprehensive yet unobtrusive technology. There is a "cyber café," offering wired and wireless Internet access, as well as a "collaboratory"—an easily configurable space equipped with the latest multimedia technologies to promote interdisciplinary team work. These latter elements are "musts" for any new library today.

As the stacks and card catalogs of yesteryear make way for the newest technologies, so, too, are the traditional roles of librarians changing. As Deanna Marcum, the Library of Congress's associate librarian for library services, commented, "The digital era, far from ending the physical library, may free it to facilitate learning rather than to house shelves—and may free those who work within library spaces to do less book processing and more learning facilitation."

Indeed, the overwhelming consensus of the symposium experts was that both the print and the virtual electronic library are here to stay. Although not a participant at the symposium himself, Vartan Gregorian might well have been describing the session with this quotation: "The greatest challenge facing us today is how to organize information into structured knowledge. We must rise above the obsession with quantity of information and the speed of transmission. We must focus on the fact that the key issue for us is our ability to organize the information once it has been amassed, to assimilate it, to find meaning in it and to assure its survival. And that cannot be done without librarians and libraries."

**Note: Information on the UC-Berkeley study mentioned above is at:**

<http://www.sims.berkeley.edu/research/projects/how-much-info-2003/>

# Symposium Reaffirms Libraries “Here to Stay” in the Digital Age

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When it comes to bricks and mortar versus the Internet, experts agree—“It is not either/or, it is and!”

“There is a role for libraries in the digital age,” declared National Library of Medicine director Dr. Donald A.B. Lindberg, opening the Library’s November 5-6 symposium, “The Library as Place: Building and Revitalizing Health Sciences Libraries in the Digital Age,” cosponsored with the Association of Academic Health Sciences Libraries (AAHSL).

Andrew Carnegie would have been proud. As it was, in forcefully putting to rest the notion that libraries are no longer needed in the age of the Internet, Lindberg struck a responsive chord with the more than 150 of the country’s top medical librarians, researchers, academic and computer experts who had convened to hear almost 40 fellow experts share their views on the changing shape, nature and role of libraries.

Over the course of 11 panel discussions and several presentations, the library of the future took clearer shape: static bricks and mortar transforming into fluid, light-filled spaces wired for both physical and virtual learning, and flexible, collaborative problem solving superceding isolated, monastic-style study.



**NLM Director Dr. Donald Lindberg affirms the importance of libraries in the digital age in his welcoming remarks to symposium guests.**

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**Symposium co-host Rick Forsman expounds on the role that libraries have played and will continue to play as gathering spots for researchers.**

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Symposium co-host Rick Forsman, director of the Charles Denison Memorial Library at the University of Colorado Health Science Center, observed that libraries have always been “a point where many different activities and people come face-to-face.”

## Four Key Needs

Because they sit at the intersection of very different physical and virtual realities, Forsman believes today’s libraries have a chance to bring people together in new ways. But they must meet four key needs revealed by a recent national AAHSL survey to measure user satisfaction with library access, facilities and service, including:

- more collaborative spaces that support group learning and problem solving;
- better noise control to shelter quiet, contemplative spaces from the talkative groups commonly found in libraries today;
- attractive, convenient and functional public space; and
- the availability of highly visible, expert and customer-oriented staff who can assist users when they are having trouble with technology or retrieving information.

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In a welcome letter to symposium participants, Congressman Bill Young (R-FL), chairman of the House Appropriations Committee, cast a resounding “Yes!” to libraries, citing them as the “cornerstone of our democracy” and “important guides to the Internet.”

“The National Library of Medicine is a model of how traditional libraries are adding digital information, which is increasingly important in serving the public,” wrote the NLM’s longtime friend.

## Inspiring Lazy Readers

Keynote speaker Timothy Hunt, 2001 Nobel laureate in physiology and medicine and a principal scientist at the Imperial Cancer Research Fund, affirmed the importance of libraries as inspirational places from his perspective as a scholar and researcher.

“The space must be right and you have to have terrific views to inspire the reader, who is ignorant, confused, lazy and easily distracted,” smiled Hunt. He developed his life-long passion for libraries growing up in Oxford, where his father was keeper of Western manuscripts at the Bodleian Library for many years.

“My father was a disseminator of knowledge because he knew where everything was in all the important old libraries of France, Spain and Europe,” said Hunt. “But mere books are not enough these days. You need computer programs to make sense of the wash of information the world is drowning under.”



The engaging, enthusiastic Nobel laureate, Dr. Timothy Hunt, made a strong case for books and online resources. Computers allow us to spin a protein in 3-D and even witness a virtual chemical reaction but, as for books, “You can’t beat having the damn thing in your hand!”

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Specifically, he is most concerned about the ability of libraries to present graphic information, such as a two-dimensional image of a cyclin protein on a printed page, for example, in a useful, downloadable three-dimensional format for interpretation by researchers. And this is where Hunt insists computer animation programs will be so helpful to the future.

A cofounder of the Public Library of Science (PLoS; [www.plos.org](http://www.plos.org)), a non-profit organization of scientists and physicians committed to making the world’s scientific and medical literature a freely available public resource, he also is a persuasive advocate for the Internet and electronic publishing.

Nonetheless, as a staunch defender of “bricks and mortar,” too, Hunt declared, “There really is no way to put a book online. You can’t beat having the damn thing in your hand!”

His favorite library? The Woods Hole Oceanographic Institution Marine Biological Laboratory Library which he considers an exemplar for its comprehensive collections, feel, views and wireless connection to the Internet.

## Libraries as Place

With Hunt setting the stage, the Library of Congress’s Deanna Marcum, Eugenie Prime, manager of corporate libraries for Hewlett-Packard (and former chair of the NLM Board of Regents), and Columbia University Librarian James Neal followed with equally spirited views of the future of traditional libraries in the day’s first panel, “Libraries—Physical Places or Virtual Spaces in a Digital World.”

“Place is *very* important,” Marcum began. “At one time or another, most of us in this room fell in love with some library. Some *physical* library.”

Also, she said that since antiquity, libraries and information media have survived together and that although entire libraries now can be put on a disk, physical libraries will still be needed because they connect learners with learning, link knowledge seekers with librarian-guides, serve as repositories of scholarly information, provide spaces for scholars to congregate and spur incubation of new methods of information sharing and distribution.

In closing, Marcum predicted, “The library will certainly change. And its need for space may significantly shrink. But the digital era, far from ending the physical library, may



The Library of Congress's Deanna Marcum observed that, far from ending the need for a physical library, the digital era may free it to facilitate learning, rather than to house bookshelves.

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Former chair of the NLM Board of Regents, Hewlett-Packard's Eugenie Prime, spoke from personal experience when she said that the virtual library can't exist without the physical one..

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Columbia University's James Neal described the agile, versatile library of the 21<sup>st</sup> century, always responsive to users' expectations. Hewlett-Packard's Eugenie Prime looks on from her seat on the panel.

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free it to facilitate learning rather than to house shelves—and may free those who work within library spaces to do less book processing and more learning facilitation. In our communities and on our campuses, the library will continue to provide a center, a commons, available to all citizens or students and scholars engaged in inquiry, symbolizing, as well as serving, our society's recognition of the power of knowledge and our democracy's reliance on access to information."

"I was wrong!" admitted Eugenie Prime, describing Hewlett-Packard's failed attempt in the early 1990s to create a virtual library to address completely the needs of its widely dispersed employee population. "It is not either/or, it is *and*," she continued. "The Web is a communications medium, a part of the information substructure. It cannot substitute for physical structure."

"Technology appears to isolate learning, erasing distance and a sense of place. The role of libraries is to restore the sense of place because more and more, people are coming together to think, dream and work. You cannot have a world-class organization without a world-class library. Libraries build communities of practice where disciplines come together and things happen," Prime concluded.

To stimulate innovation, H-P maintains three corporate libraries in California and others in the United Kingdom and Europe to serve its 140,000 employees in 62 countries through a combination of traditional and digital services.

In emphatic counterpoint to Marcum and Prime, Columbia's Neal predicted that within a decade "medical libraries will have outgrown their need for space."

"Electronic publishing has gone from a trickle to a flood, we continue to explode the limits of time and space, libraries soon will be delivering customized information and open models like 'PLoS' will dominate," Neal stated. "There is a revolution in global learning and libraries must transform themselves into entrepreneurial information gateways, offering new, self-service, interactive information systems served by the best technologies.

"The key is to understand our users' expectations," he continued. "It is what we do with the infrastructure which matters. The future points to the open, virtual electronic library featuring shared information which will be a test-bed for innovation. The focus will be on speed and productivity. Large campus collections are obsolete and unjustifiable as expensive warehouse space."

"Technologies must accelerate in the hands of librarians so we must not wrap notions of the library in a warm, fuzzy past," Neal argued. "The challenge is to capture, design, organize and use massive information through a global, standardized system."

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“This ‘virtuality’ must be complemented by the virtuoso librarian, who is ever-present, on site and online. We must replace spaces with new visions of information,” he concluded.

## Shifts in the Library’s Role

As if on cue from Neal, Philip Pizzo, dean of the Stanford University School of Medicine, led off the next panel discussion, “Education, Research & Clinical Practice—Library Role Shifts within Academic Medical Centers,” describing Stanford’s new SMILE (Stanford Medicine Information and Learning Environment) facility.

“It will be the place to go,” said Pizzo, “a knowledge management center and learning hub to support a new medical curriculum which will incorporate clinical investigation from the first year of medical school on, providing students the opportunity to develop original investigations while also learning the basics (<http://www.stanford.edu/dept/news/report/news/2003/april30/curriculum.html>.)”

Scheduled for completion in 2008, the SMILE building will combine new classrooms and a library featuring high-technology communication and learning systems, simulation devices, immersive learning environments and an advanced information system.

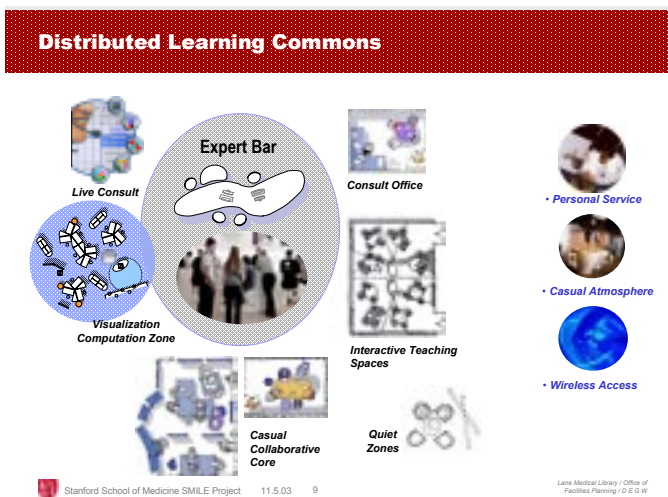
“SMILE will be at the crossroads of all disciplines,” Pizzo said, “linking the physical and the virtual for anytime learning, anywhere.”

For the 1996 renovation of Harvard’s Countway Medical Library, a “1965 monument with extraordinary collections” according to director Judith Messerle, the goal was to “concentrate on bringing our users—by behavior, not type—together with our collections and services.”

“We focused on what the clinician, the physician and the researcher need and, in the process, went from print to electronic, from monolithic back room to end-user satisfaction, and from service to partnership,” said Messerle. Issues they faced included responsibilities for preservation and archiving; staff growth, qualifications and flexibility; the academic versus service model; training versus education, and community space needs.

“Since 1960 there has been an algorithmic explosion of published knowledge which individual libraries cannot preserve and archive, so the National Library of Medicine must do so,” said Messerle. “We need to partner more, too, and reference librarians need to be more in the classroom, helping to educate. Also, as the only common meeting ground for Harvard Medical School and the School of Public Health, Countway’s community space has to be a neutral, cultural place (with art on the walls and music in the halls) for people to come together.”

Concluding, Messerle said, “Countway will never be entirely digital but we would do some things differently now than we did seven years ago.”



Stanford School of Medicine Dean Philip Pizzo described his school’s SMILE facility, scheduled for completion in 2008, as “the place to go.” It will combine classrooms, virtual and physical libraries and immersive learning environments, among other facilities.



William Stead, Vanderbilt University’s informatics center director, and Judith Messerle, director of Harvard’s Countway Medical Library, discuss the special challenges of library renovation. Vanderbilt’s Eskind Biomedical Library has seen several phases of transformation since the early 1990s.

For the 1991-94 renovation of Vanderbilt University's Eskind Biomedical Library (<http://www.mc.vanderbilt.edu/biolib/staff/librariansynopsis.html>), university informatics center director William Stead said, "In addition to improving our bioinformatics and public spaces, we wanted to create a hub for the medical center where it would be easy to drop in and get information *with help*. The library is committed to service, and its most important resource is the expertise of its staff."

As part of the transformation, under an award from the National Library of Medicine's partnership program, begun in 1997, the medical center undertook a project to incorporate the digital library into the workflow of Nashville-area public health professionals to better meet their information

needs. Today the medical center is making greater use of PubMed Central, the National Library of Medicine's digital archive of life sciences journal literature, which has allowed it to discard non-unique information and free up valuable space.

Additional building blocks at Eskind include more electronic records and archival functions, and a concentration of the core competencies of librarians to make them members of clinical teams. Librarians help students, residents and faculty stay abreast of the latest findings in the literature by actively participating on clinical rounds and providing targeted support to researchers. Bioinformatics support is provided through regular training classes and individualized consultations.

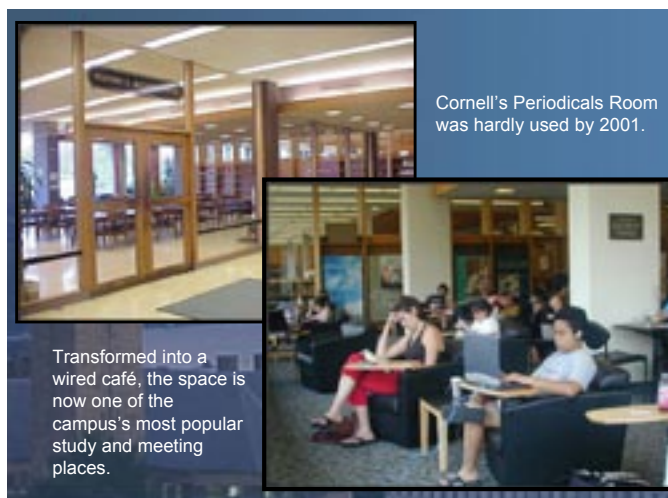
## The Place for Scholarship

Sarah Thomas, Carl A. Kroch University Librarian at Cornell University, led off the first of three post-luncheon panels, "The Library—The Place for Scholarship," pointing to current trends in library facilities. Among other things, these include high-density storage of print and other collections, and shared, preserved, secure regional and national document delivery.

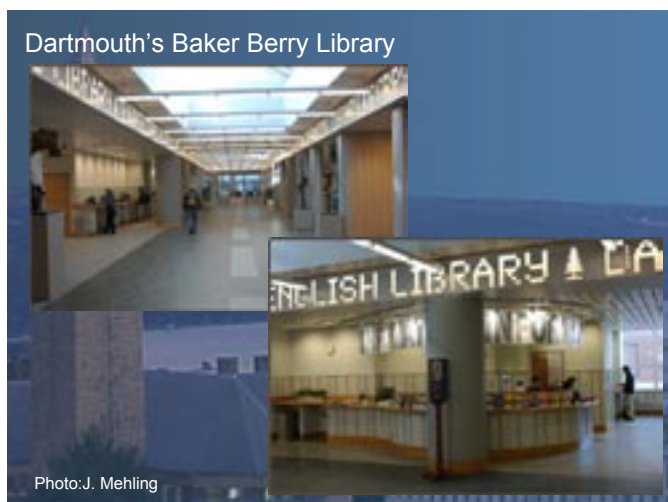
Card catalogs are gone, replaced by electronic portals and the National Library of Medicine Web site ([www.nlm.nih.gov](http://www.nlm.nih.gov)), which provides for *one-stop shopping* for an increasing number of the library's information resources. Computer reading spaces are replacing traditional stacks and library staffs are dispersing, with collections people moving to satellite facilities such as the Harvard College Library Technical Services facility, opened in 2000 and housing 80 staff about a mile away from Widener Library.

Also, as former traditional spaces are vacated, Thomas pointed out they are being put to new uses. As examples, she cited Cornell's periodical room, virtually empty three years ago but now a wired café and "one of the most vibrant public spaces on campus"; the University of North Carolina's student lounge, recently renovated with high quality lighting and inward-facing seating (which fosters a sense of community); and Rochester Institute of Technology's "soap box" space, reserved, like Hyde Park's famed "Speakers Corner," for people to vent on any issue under the sun.

One of Thomas's more interesting examples of the trend toward single points of service was the mall concept embodied in Dartmouth's new Baker Berry Library, where different user needs are met along a walk-through corridor, similar to the University of Chicago's John Crerar Library's multi-purpose facility, housing a cyber café, multi-media and collaborative work spaces, print station and technical assistance center.



This slide from Sarah Thomas of Cornell University shows how existing library spaces can be put to new uses.



At Dartmouth's Baker Berry Library, different user needs are met along a single walkthrough hallway. This "mall" concept is catching on at many contemporary libraries.

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"There is a redefinition of user space to better serve staff and user needs while fostering collaboration and community," noted Thomas.

Talking about the 1999-2001 renovation of the Claude Moore Health Sciences Library of the University of Virginia Health System, director Linda Watson remarked, "We understood that to facilitate scholarship, it is difficult to separate teaching, learning and discovery. For us, that meant location and physical considerations were prime."

"Our new facility promotes individual and group study and is the physical gateway to print and electronic knowledge. We are wired and wireless throughout and our librarians are colleagues and team members," she said.

From its formation in 1847 with the donation of three volumes, the New York Academy of Medicine has grown to house one of the most important collections of rare biomedical texts in the world and become a leader in urban medicine. Its need for space always has been closely tied to its mission.



The architect's drawing shows the proposed addition to the New York Academy of Medicine. Of paramount importance was a design that would join the new with the old at this institution, founded in 1847.

"We are a research-intensive institution dedicated to the urban population," said director Dr. Jeremiah Baroness. "Our charge is to innovate in the assembly, management and movement of information, with the goal of reducing urban health disparities, the nation's No. 1 health problem."

Since a reorganization in 1990, the staff has expanded from 40 to 240 professionals, with the majority devoted primarily to research and public health. The need for additional space beyond the academy's existing three buildings is acute and there are plans for a new facility to "join the new with the old," as Baroness put it.

The Academy's strategic plan envisions a divisional structure in which a maximum staff of 400 researchers and health professionals are focused on:

- Health preservation;
- Disease reduction;
- Health care; and
- Urban disasters (including studies of the impact of 9/11 on the New York metropolitan populace).

Space implications include accounting for the future of the Academy's vast printed materials, research functions, communication infrastructure, scholarship needs, program expansions (in public health and education, to name but two) and the impact of further growth.

In sharp contrast to the NYAM's urban requirements were those presented by Catherine Norton for the Marine Biological Laboratory-Woods Hole Oceanographic Institution Library (MBL/WHOI Library), which she directs.

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“We have one library serving two institutions, plus small libraries aboard each of our three research ships,” said Norton. “People congregate at the library for its great views and its totally wired (and wireless) environment.” With the continuing explosion of knowledge, Norton said the library “focuses on what libraries do best—support expert people with trusted information services, collections preservation, information dissemination, education, collaboration and contemplative space.”

In fostering a collaborative, collegial environment, the library’s space needs must account for its worldwide consortium of scientists, the publishing revolution taking place in all media, the construction and maintenance of digital libraries (“Bits and bytes aren’t cheap,” says Norton) and its people, including staff and the scientific community.

“Our future plans are designed for concepts, services, collections, place, partners, portals and people,” Norton declared.

## **Discovery, Learning and Education**

The practical aspects of renovation and the theoretical challenges of architectural design relating to libraries as places for “discovery, learning and education” occupied the afternoon’s second panel, which featured Carol Jenkins, director of the University of North Carolina at Chapel Hill Health Sciences Library, Shirley Dugdale, A.I.A., senior consultant of the international design firm DEGW, and Parvati Dev, director of the Stanford University Medical Media & Information Technologies (SUMMIT) laboratory.

Throughout a “stem-to-stern” renovation in 2002, Jenkins said her library’s motto was “Open for renovation, prepared for aggravation.” User needs were met through a combination of dispersed and virtual services.

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*Design elements in demand include “cells” for individual scholars, “hives” to house many independent scholars at once, “dens” for interactive and collaborative work, and “clubs” for variety and expert support.*

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From extensive focus group work with users, Jenkins and her team determined the new library should have to:

- Be a physical *and* virtual information hub;
- Present an inviting, comfortable *human* space with lots of color and good natural and electric lighting;
- Offer a range of functional work spaces for users and staff;
- Be flexible enough to meet changing needs; and
- Assure unobtrusive but comprehensive availability of technology to connect people and knowledge everywhere.

Strategies to achieve these goals included: compact shelving (permitting removal of 200,000 volumes into storage); increased user and staff work spaces; a new IT infrastructure with ten staff, 40 servers and a telecommunications hub; a fail-safe generator for emergency power outages; a user services desk; and “media kitchens” featuring multi-media technologies and trained curriculum support-specialist “chefs” to provide timely technical assistance.

Additionally, there were: all-purpose workrooms, called “enclaves;” a cyber café, accessible through an outside entrance offering wired and wireless Internet access and potential 24/7 service and, a “collaboratory,” a neutral space for interdisciplinary team work characterized by easily configurable areas and featuring the latest multi-media technologies.



**Parvati Dev of Stanford shows the intriguing new library work spaces available to medical students of the 21<sup>st</sup> century.**

DEGW's Dugdale commented that today's design emphasis is on new ways of active, collaborative learning. "We are in transition from location-centric to location-independent learning, to 'learning communities' connected in and across space," she said. "So you need a mix of compelling spaces, like the Crerar Library, with its variety of flexible spaces, to meet the needs of different types of students and classes."

Design elements in demand include "cells" for individual scholars, "hives" to house many independent scholars at once, "dens" for interactive and collaborative work, and "clubs" for variety and expert support. Also necessary are distributed commons areas and new types of consultation spots to "teach users at their points of need."

As a good example of the latter, Dugdale singled out the Welch Service Center in the Welch Medical Library at Johns Hopkins University, a central service point that includes reference, circulation and the library's School of Medicine reserve collection. It also includes the library's new books and journals, public access computers, access to the library's two main reading rooms, and the entrance to a reference stack.

From her point of view, panelist Parvati Dev, director of the Stanford University Medical Media & Information Technologies (SUMMIT) Laboratory ([www.summit.stanford.edu](http://www.summit.stanford.edu)), declared that since medical education is changing everywhere, "Future medical students will be multi-taskers used to absorbing information through multiple channels."

As had her Stanford colleague Phillip Pizzo earlier in the symposium, Dev emphasized their university's SMILE project, saying it would facilitate:

- small group discussion, case-based, reflective learning;
- integration of basic and clinical research with an emphasis on early clinical, evidence-based medicine; and
- new learning tools with technical support provided through online courses, virtual patients, simulators, streaming video and more.

## The Library as the Public's Place

The day's final panel devoted its energies to a vision of the library as the "Public's Space & Place." Leading off was Frieda Weise, executive director of the Health Sciences and Human Services Library, University of Maryland at Baltimore, who reported the new facility was seven years in the planning and that, as a result, "Our spaces have become public because they were designed to be flexible."

She counseled her peers to "consider the library as destination." "There is a need for people to gather, face-to-face," she continued, "but you must look beyond traditional uses because there are limits as to what a library can be." To her, libraries are logical places for meetings (library committees, book clubs), conferences, exhibits (art), receptions (library, university, public), community events and to showcase achievements.

"All of these pose design considerations," Weise said, "including impact on library operations, the proximity of food preparation, noise control and more. In addition, there are policy issues to consider: who controls and schedules the use of public spaces? Who can use the spaces and for what purposes? Who maintains and repairs the spaces? What about security?" she asked in conclusion.

Carole Wedge, of the Boston architectural firm Shepley Bulfinch Richardson and Abbott, said the library is a "visual community tool for seeing and being seen" and a "showcase for the academic community." After a decade of library building and renovation, she predicted a more difficult period ahead for library construction and advised that a better job must be done connecting a library's physical and digital spaces so they relate better to users.

According to her, library design is influenced by the volume of information to be handled, our consumer culture ("Library staff need to serve 'customers'"), technology's impact on our historic forms of culture, and the science of learning ("Understanding and better supporting it.")

Princeton University Librarian Karin Trainer differed with Wedge, saying she was "bullish" on libraries for the future. "We have spent \$100 million on libraries at Princeton since 1996 and are likely to spend an equal amount in the next five to six years," she reported.

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*Opening the first panel of the second day, Gretchen Hallerberg, manager of the Cleveland Clinic Library, drew a round of applause for reinforcing the importance of medical libraries and librarians: "We are on the front lines of health care delivery. We respond to needs."*

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Wedge believed there are “huge dividends to be reaped from designing libraries as public spaces” and pointed to the reintroduction in new libraries of “such old, discarded elements as theaters, auditoriums and seminar rooms, exhibit spaces and food service.” Since there are no design parameters for libraries about such things, she counseled participants to look to museum designers who understand how to incorporate such elements.

Above all when including the public in libraries, Wedge said the public “demands transparency” and wants to know the “rules of the road” in order to feel comfortable and secure within the library as a public space.

## On the Front Lines of Health Care

Opening the first panel of the second day, “Diagnosis: America’s Hospital Libraries,” moderator Gretchen Hallerberg, manager of the Cleveland Clinic Library, drew a round of applause for reinforcing the importance of medical libraries and librarians: “We are on the front lines of health care delivery. We respond to needs.”

Then she turned the podium over to Barbara Epstein, interim director of the Health Sciences Library System for the University of Pittsburgh, who discussed the Hopwood Library of the University of Pittsburgh Medical Center, which was redone in 2000. After three years of growing pains, Epstein confided that she and her colleagues now understand that some things could have been done differently to improve responsiveness to library users, including:

- more CD ROM- and Web-based education programs;
- closer analysis of the impact of HIPAA (Health Insurance Portability and Accountability Act) privacy provisions on open computer access (especially to patients and families) when computers are practically ubiquitous in the medical library setting;
- more modular shelving for greater flexibility;
- more group study space;
- increased display space; and
- more space for group and private consultation.

Following Epstein was Mary Bayorgeon, director of the Clark Family Health Science Library, opened in 2000 and one of two such libraries in the three-hospital, 17-clinic Affinity Health System serving rural, northeast Wisconsin.

“Community hospital library needs are unique,” she said, “so when you’re designing them, current trends are very helpful guides.”

Among the more important to consider for their design impact are:

- increasing consumer demand for health information, online and on site (which can be met through combining professional and consumer health libraries, or maintaining separate facilities, or creating joint ventures with public libraries, or offering branded electronic services and more);
- widely dispersed hospital and clinic staff (meaning fewer professionals on site to use the library, which reduces space and furniture needs);
- virtual libraries (which are costly, with few staff having the time or expertise to maintain, and present licensing and archiving issues, and technical problems, but which reduce workroom and print archive space, freeing more room for computers);
- outreach programs (satellite locations serving the community, including providing photocopying, scanning and other business services);
- greater emphasis on privacy (HIPAA-driven need to enclose computer station areas for confidentiality); and
- continuing availability of newer and newer technology (wireless Internet, multi-functional equipment reducing space needs).

Bayorgeon predicted that the community hospital library of the future will be a service center, similar, perhaps to the Clark Library, which offers both a professional research facility, accessible to doctors and researchers through



Mary Bayorgeon offered a different perspective from those affiliated with university libraries. She directs the Clark Family Health Sciences Library, a community hospital library serving rural, northeast Wisconsin.

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*“All plans are not small, so make no little plans,” declared Steven Foote, chairman of Perry Dean Rogers/Partners. “They are essential to delivering the product.”*

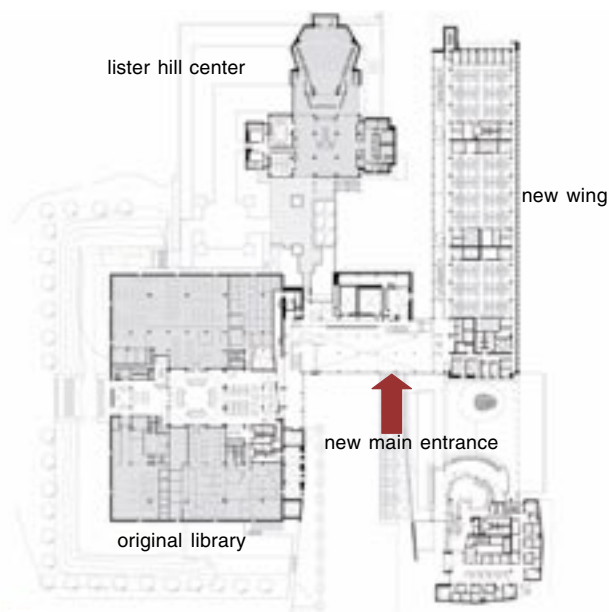
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an entrance from the adjoining hospital corridor, and a Consumer Health Information Center, entered through another door immediately adjacent to the main hospital patient registration entrance.

For Catherine Boss, who followed Bayorgeon and is coordinator of library services at the Booker Health Sciences Library, Jersey Shore University Medical Center, location is the most important attribute for a medical sciences library. “It must be visible, easy to find, with convenient entrances and sizable enough to provide a variety of services.”

Designed to meet the informational, educational and research needs of health care professionals and the community, the 5,000 square-foot Booker opened in 2001. It combines an extensive nursing collection (formerly housed in a termite-ridden, difficult-to-find basement room), a medical library (rescued from another uninviting, little-known area), and a consumer health center offering a broad range of easy-to-use health information, including Internet sites, databases, magazines, and journals.

Containing more than 13,000 books and journals as well as over 2,000 audiovisuals, 350 periodicals and 14 computers, the Booker has become a showcase for the hospital, popular with the public, patients and families, and staff.



The floor plan for the new NLM complex, from Perry Dean Rogers/Partners, designers of the new building. In addition to new meeting spaces and offices, the new complex expands the stacks in environmentally controlled subterranean space.

## NLM Building Project

NLM deputy director Kent Smith presented the National Library of Medicine’s case for a proposed new building in the second panel of the morning, which also featured Steven Foote, chairman, Perry Dean Rogers/Partners, designers of the new building, and David J. Lipman, director of the National Center for Biotechnology Information (NCBI), the division of the NLM that will occupy the new building.

According to Smith, who has since retired, the NLM is bursting at the seams, with 1,100 staff members occupying space designed for 650. By 2005, the library will be out of room. “As the library of last resort,” said Smith, “we need more space, more staff and more expertise.” He cited the library’s expanded mission, explosive program growth (especially in biotechnology) and ever-growing collections as principal reasons for the new building, which he predicted would be adequate for the next quarter-century.

“So bring on the bulldozers!” he cried, turning to Foote, principal architect for the project, which has been four-and-a-half years in the making.

“The key architectural question throughout has been the nature of the way people work together and how to respond to that,” Foote said. Practically, the challenge is to tie the two existing NLM buildings together with the new space, which will be devoted primarily to research. Within this context, there are two major elements: the library’s archives, which Foote termed a “static, essential mass of knowledge,” and its people, “whose needs always change.”



The proposed new NLM building, shown in the top right quadrant, includes many spaces for meetings and collaborations, as well as individual study areas.

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*“Collaboration is becoming more intensive in biomedical research,” Lipman said, with “increased data flow to and from users and increasingly complex information being exchanged. Although most of this is electronic communication there is a critical role for bringing people together.”*

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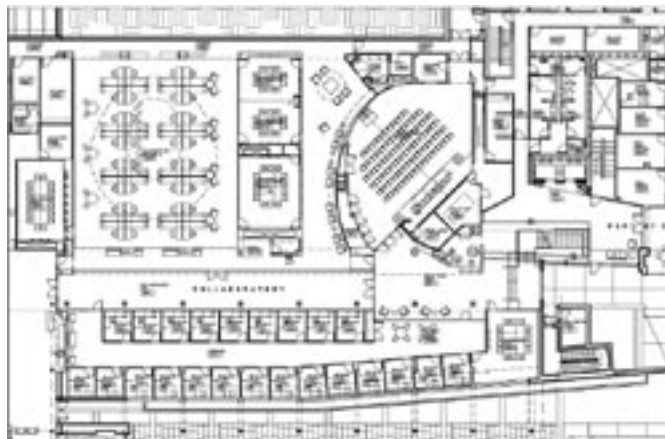


**The headquarters of the National Center for Biotechnology Information in the proposed new NLM building.**

To unify, Foote’s design calls for a broad atrium entrance facing north, from which staff and visitors can radiate to the new research facility, Lister Hill or Building 38. To promote the collaborative work style of the future, he has made the atrium long and narrow, placing meeting rooms immediately adjacent for small and large groups, and included a “collaboratory.” A cyber café and extensive use of glass walls will encourage the serendipitous, productive meetings among the tremendous number of researchers expected in future. Roof gardens in a secure environment will foster quiet contemplation.

“Subsets of people shift and change,” said Foote, “so you don’t really know the dimensions, size and complexity of what they need to work together.” That is why in addition to arranging the new building for both collaboration and chance productivity, Foote has left room for future expansion.

NCBI’s Lipman was enthusiastic about the new building, which will bring his staff together for the first time in one place. He said he expects individual researchers, groups of scientists and experts, and ongoing data groups to take advantage of the new research spaces and various collaborative spaces which will hallmark the new building and consist of:



**The “Collaboratory” will bring together staff from NCBI and other NLM components, NIH scientists, scientists throughout the country and around the world, and medical librarians in a shared space where face-to-face collaboration can be combined with people-to-computer interactions.**

- a large (2,786 square feet), open plan workspace with direct access to meeting rooms and a breakout space;
- a conference/meeting room for up to 25 people, plus two smaller meeting rooms seating up to a dozen;
- 23 enclosed, individual studies for private study and longer-term occupation by visiting professionals;
- an informal meeting area within the scholar studies area;
- a 2,400 square-foot press room which can also be used for meetings and conferences; and
- a 1,000 square foot breakout area adjacent to the press room.

“Collaboration is becoming more intensive in biomedical research,” Lipman said, with “increased data flow to and from users and increasingly complex information being exchanged. Although most of this is electronic communication there is a critical role for bringing people together.”

As envisioned by Lipman, the collaboratory will greatly enhance community resources, spurring research collaborations, curative efforts, consensus conferences and high-level syntheses of data and literature.

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*One of the survey's principal findings, agreed to by 96 percent of those participating, was that by 2015, the National Library of Medicine's role as the library of record in biomedicine will become even more critical as academic libraries increasingly withdraw print materials and rely on the NLM to hold print copies.*

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## **Library Space Considerations**

Hard on the new NLM building's virtual heels came James Shedlock, director of the Galter Health Sciences Library at Northwestern University's Feinberg School of Medicine, Chicago, to describe how, in the Galter's 1994-96 renovation, they tried to plan for the library of the 21<sup>st</sup> Century by:

- listening closely to the needs of staff and users;
- accounting for the growth and preservation of collections;
- incorporating the latest technology; and
- limiting both spending and space.

As a result, seating was increased from 147 to 400, the staff received new offices and expanded work areas, collections space was enlarged to accommodate 300,000 volumes, 200 Internet ports were wired, and better seating, lighting and traffic flow were achieved. "And the library retained its 'classic feel'," Shedlock added.

Through a formal LibQual user survey measuring qualitative issues, Shedlock said the renovation was able to achieve the "visually appealing, contemplative, meditative, secure and safe environment" users said they wanted.

As for future library space, Shedlock said "What to do with the stacks?" is the core issue. "It forces you to look at what to keep and what to toss. Is a library a library without the stacks? That depends on its changing role, as well as the evolving roles of librarians and their requirements. If you get rid of the stacks, you have to redefine librarians in a different way."

In conclusion, Shedlock advised participants to "articulate your vision, listen to the staff and users, plan for local and future needs and, above all, be bold, assess the risks and do the right thing!"

Not surprisingly, Lynn Connaway, representing the Online Computer Library Center (OCLC), advised everyone to consider the effect of electronic resources on a library's space considerations. Founded in 1967, OCLC Online Computer Library Center is a nonprofit, membership, computer library service and research organization dedicated to the public purposes of furthering access to the world's information and reducing information costs. More than 45,000 libraries in 84 countries and territories around the world use OCLC services to locate, acquire, catalog, lend and preserve library materials.

Borrowing from Bob Dylan, she noted, "The times they are a changin'," especially information use:

- five billion gigabytes generated in 2002, the equivalent of 500,000 Libraries of Congress;
- 92 percent of the information stored on hard drive;
- Paper use way up because of the surge in printing generated by e-information;
- 80 percent of adult Internet users searched for at least one health topic online;
- women are the primary users of e-health information; and
- such searches lead to improved health services, which leads to greater desire for more useful information.

But Connaway did not preach exclusive focus on the digital library, emphasizing as others had previously, "It is not 'either, or,' it is 'and.' The challenge is to provide the best of both worlds."

And that's just what's happening—from the ground up—at the Fitzsimons campus of the University of Colorado Health Sciences Center (UCHSC) and the University of Colorado Hospital (UCH). As reported by Rick Forsman, director of UCHS Denison Library, the new project pro-

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*"Is a library a library without the stacks?," Shedlock asked. "That depends on its changing role, as well as the evolving roles of librarians and their requirements. If you get rid of the stacks, you have to redefine librarians in a different way."*

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vides for the UCHSC to expand from its cramped 46-acre Denver campus to 217 acres at the former Fitzsimons Army Medical Base in nearby Aurora.

Slated to take place by 2007, the initial phase of the move to Fitzsimons is estimated to cost \$1.3 billion, and will result in a substantial increase in available space—from 2.7 million gross square feet at the current location to 3.4 million gross square feet at the new campus. An additional 1.5 million gross square feet of space, mostly for research, is to follow the initial transition period.

A new \$35 million library, located at the center of the medical center, will be the project's "signature" building. Scheduled for completion in 2006, it is to have 77,000 assignable square feet (out of a total 116,000 gross square feet), with 30,000 ASF devoted to user space. There will be 46 small group rooms.

Guiding design principles are to:

- promote interaction and collaboration;
- contain unscheduled space for user convenience;
- be flexible;
- be aesthetically pleasing;
- embrace Colorado's climate; and
- act as a hub of knowledge and data transfer.

For the future, Forsman predicted that libraries will have to accommodate nomadic learners and divergent users with mobile work styles and offer high-tech imaging and 3-dimensional video capabilities.



**The University of Colorado's new Health Sciences Library at Fitzsimons will be the new campus's signature building when it opens in 2006**

## **Make No Little Plans**

Picking up from the ambitious Fitzsimons project, Steven Foote returned to the podium for some specific guidelines for would-be library builders. "All plans are not small, so make no little plans" he declared. "They are essential to delivering the product. But there is a process and librarians are in the middle," he noted. Other important players include the administrators, donors, trustees, government agencies (local, state and federal), programmers and the architect, not to mention the small army of engineers and others reporting to the architect.

With so many involved, it is essential to control the process from the start because the program is "more than just square footage" and you must "beware of the devil," by which Foote meant a building's "net assignable area" to gross square footage, which averages 65 percent to 70 percent of total construction due to the space taken up by columns, corridors, elevators, wall thicknesses and stairs.

Because of this it is practically mandatory to insist on options, such as different entrances, for example, and to question all assumptions about how the various spaces will be used. "Will you put readers below ground and the collections above?" he asked, facetiously flashing a slide of the Bibliothèque Nationale's twin towers in Paris, which do just this.

It is also wise to ask for agendas, such as how much natural lighting is being requested, or the degree of sustainability the building is to achieve. The last of Foote's imperatives is to define place making, such as establishing the building's imagery, scale, quality of place and degree of formality; whether there will be a "building within a building," such as a distinctive collaboratory, or solitary readers for scholars, and how many private offices there will be versus flexible team spaces, and the number of breakout spaces, meeting rooms and conference areas.

## **Designing for Sustainability**

Alexander Lamis, of Robert A.M. Stern Architects, and the Rocky Mountain Institute's Jeremy Faludi, covered the growing trend toward making new buildings as sustainable as possible, with new materials and building techniques which combine the best of ancient, vernacular building traditions from around the world with modern, analytic design capabilities.

Lamis, an expert in sustainable design who was Architect-in-Charge for the new, 300,000 square foot Nashville, TN public library, opened in 2001, listed the principal considerations for sustainability as being:

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*Faludi, who is both engineer and designer, is a leader in the emerging field of biomimicry, which uses nature as inspiration, measure and mentor for creating new buildings.*

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### Special considerations for library buildings

- Temperature and humidity control should be carefully analyzed. More restrictive controls require greater energy inputs. Match design to value of materials.
- Filtering for natural daylight.
- Ease of maintenance and durability versus first cost.
- Flexibility in design; ability to reconfigure space as needs evolve
- Long range institutional outlook.
- Is sustainability part of your educational mission?



Nashville Public Library

Architect Alexander Lamis, a partner with Robert A.M. Stern Architects, discussed the growing trend of making new buildings as sustainable as possible. Some of his special considerations for library buildings appear in this slide, along with a view of his project, the Nashville (Tennessee) Public Library.

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- building size;
- solar and artificial lighting control;
- mechanical systems design;
- construction materials; and
- construction methods.

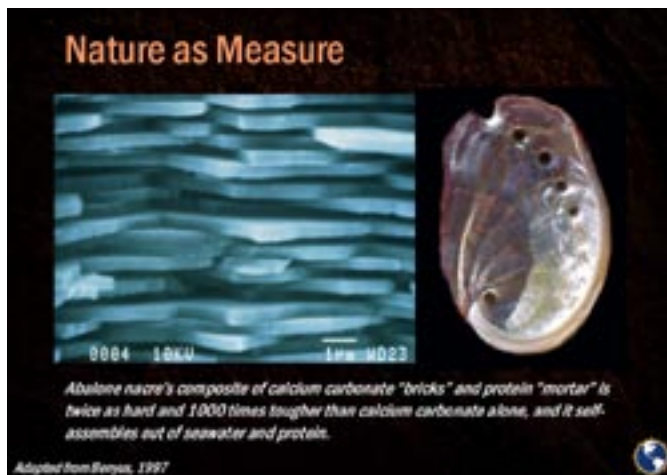
Special considerations for libraries include temperature and humidity controls, which must meet precise collections requirements (and therefore may be more costly); filtering for natural light, ease of maintenance and durability of systems versus the cost; the need for flexible, easily reconfigurable spaces to meet changing needs; the long range outlook, and, lastly, whether “sustainability” is part of the library’s education mission.

Lamis defined “suitable” design as:

- responding to current, high use of energy and other natural resources;
- a group of techniques and approaches to conserve energy and materials which promote environmental stewardship;
- an approach which relies on performance metrics; and
- an affordable alternative to more traditional design methods.

Faludi, who is both engineer and designer, is a leader in the emerging field of biomimicry, which uses nature as inspiration, measure and mentor for creating new buildings. By copying the forms, processes and systems found in nature, he posited that buildings can become more environmentally sensitive and sustainable. Biomimetic designs include natural lighting, use of plants and water, lotus petal paint and carpeting that mimics prairie grass.

Biomimicry works best when you find the principles that nature is using and copy those principles, not their actual implementation, Faludi told his intrigued audience. Commenting on nature-inspired products such as Velcro, based on the burrs that catch on our clothing, and hailing the sturdiness of the delicate abalone shell and the tensile strength of spiders’ silk, he eventually drew the following conclusion: Nature-like spaces inspire quality of life, increase productivity and learning, and can even reduce absenteeism.



Engineer and designer Jeremy Faludi of the Rocky Mountain Institute specializes in biomimicry—the use of nature as inspiration, measure and mentor for the creation of new buildings. Here he shows the sturdy “bricks and mortar” composition of a delicate abalone shell.

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## **What a Library Is Depends on What it Does**

Logan Ludwig, associate dean for library sciences, Loyola University Medical Center Health Sciences Library, and Susan Starr, associate university librarian sciences director, Biomedical Library, University of California, San Diego, reviewed the results of a Delphi Study, "What a Library Is Depends on What it Does."

They noted, among other things, libraries are:

- economic engines, annually generating some \$14 billion in the U.S. alone;
- logistics experts, making 5.4 million shipments daily (versus FedEx's 5.3 million) in the U.S.;
- valued destinations, recording more than 1.1 billion visits a year in the U.S., and 16 billion globally;
- global information suppliers; and
- home to a sizable profession, including 203,000 U.S. librarians.

Other important statistics Logan cited were:

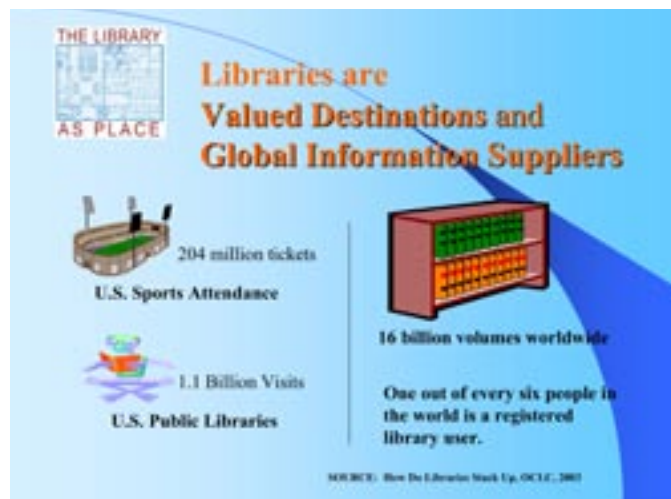
- \$25 billion in U.S. book sales in 2002;

- \$5.13 billion professional and scholarly book sales in the U.S. in 2002;
- Independent scientists obtain 64 percent of the journals they read from libraries;
- Two-thirds of U.S. households buy books;
- Books are the No. 1 source of new information for people;
- 139,800 libraries in the U.S. in 2002;
- 271 new libraries built in the U.S. in 2000; and
- 655 electronic journals carried by medical libraries in 2002, up from just 73 in 1996.

One of the survey's principal findings, agreed to by 96 percent of those participating, was that by 2015, the National Library of Medicine's role as the library of record in biomedicine will become even more critical as academic libraries increasingly withdraw print materials and rely on the NLM to hold print copies. This will reduce the size of libraries and increase available space because, participants agreed, "we have to rely on someone." Some viewed as "risky" the NLM being the library of record because it may not have the funding to provide the huge expected leap in copying services.

Additionally, the survey showed that by 2010:

- wireless Internet connection will be ubiquitous;
- consumer health service points will be essential;
- there will be close relationships between libraries and bioinformatics operations;
- there will be fewer lower level staff and more senior staff; and
- within libraries, bandwidth will no longer be an issue.



Researchers Logan Ludwig of Loyola University and Susan Starr of the University of California, San Diego, presented the results of a Delphi Study, "What a Library Is Depends on What it Does." Here is a panel showing part of their findings.

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*655 electronic journals were carried by medical libraries in 2002, up from just 73 in 1996.*

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*Books are the No. 1 source of new information for people, reported Logan Ludwig and Susan Starr.*

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By 2015:

- electronic articles will be the chief information unit;
- libraries will be knowledge management centers; and
- departmental libraries will have disappeared.

In summary, libraries will be:

- knowledge management centers;
- sites for study and consultation;
- places to use highly specialized technologies;
- centers of curriculum development;
- sites for support of clinical trials and Institutional Review Boards;
- publishers of institutional information;
- repositories for faculty and research data;
- providers of special services to clinicians and the community; and
- looking to AAHSL, NLM and others as important change agents.

## Teamwork and Library Design

In the symposium's last panel, the teams of Joan Zenan, library director, University of Nevada School of Medicine, and Phil O'Keefe, A.I.A., Lundahl & Associates-Architects, and Judith Robinson, assistant dean for library and learning resources, Edward E. Brickell Medical Services Library, and Barry E. Moss, A.I.A., Tymoff & Moss Architects, presented their collaborative efforts to produce, respectively, the new Savitt Medical Library, at the U of NV School of Medicine, in Reno, NV, and the Brickell Library at Eastern Virginia.

For the first team, partnering and constant, explicit communication were key to rescuing a project which had begun before O'Keefe joined it and which he described as being "in controversy," characterized by soured expectations and bad communication.

The first step was to meet offsite so the parties—program planners and designers, construction architects, contractors, the university's facilities department, state public works board members and other principals—could establish a system of partnering and agree to a hierarchy of authority and process, effectively making certain that people knew who was doing what, by when, for what reason, etc.

Construction began in July of 2000, followed by a "topping out" ceremony in March, 2001, to "re-motivate" the contractor, according to Zenan. By that August, the library was mostly enclosed and the staff was thrilled. Then things slowed drastically until the library was finally dedicated in May 2002.

Some of the positives learned include the value of open communication, reinforcing morale and accountability through partnering. Some of the negatives were design-by-committee, leading to mediocre form and function in some



Architect Phil O'Keefe of Lundahl & Associates and Joan Zenan, library director at the University of Nevada School of Medicine, described the benefits and drawbacks of the collaborative effort that produced the unique, pie-shaped Savitt Medical Library, pictured here, center.



Judith Robinson, assistant dean for library and learning resources at the Edward E. Brickell Medical Services Library, teamed with architect Barry E. Moss of Tymoff & Moss to produce this addition to an existing building at the Eastern Virginia Medical School, Norfolk. Although the project was on a fast track from the start, the Robinson-Moss team still took time to include such aesthetic touches as the Jeffersonian dome.

instances, too many funding sources and various personal agendas, all of which led to inefficient use of space and extra costs.

The conclusion: There are always issues with a building project, so people should not take them personally.

The Robinson-Moss team accomplished a seeming miracle when, in the space of six months, they were asked to design, win approval for and begin building a new addition to an existing, unattractive 1960s building. As Moss put it, the project also included some “peculiar restraints:”

- 60,000 square feet in size
- four stories high
- 60 feet wide and 300 feet long
- accommodate existing natural light in the original building
- be “Jeffersonian” in feel
- design to the low bid
- complete in 12 months

Exclaimed Robinson, “We got a beautiful building because of great planning and excellent teamwork.”

## **Lindberg Summarizes...**

“Thanks for an outstanding meeting,” said NLM director Lindberg, who summarized a few of the symposium’s findings as including:

- looks are important to libraries; they must be both visible and aesthetically pleasing
- the system is responsive to these concerns
- libraries are dependent on the National Library of Medicine (“and we hope we are ready”).
- medical libraries are changing and there is more to come, but medical libraries and librarians will continue to be needed
- the medical library is an important, local intermediary for information
- institutions must adapt to changing needs and missions
- medical libraries are places of quiet refuge, cherished beyond the speed of technology
- trusted health care information for the public is an increasing concern and commitment of medical libraries, but this means partnering with the public is inevitable
- medical libraries and librarians contribute to society by contributing to users and their changing needs
- the future is both print *and electronic*

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## NLM NEWSLINE

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