West by East - East by West: Cultural and Technological Exchange *in the Case of Global Memory Net*

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Abstract

Since 2000, Global Memory Net, supported by the US National Science Foundation/ International Digital Library Program, has developed to be an effective world culture and heritage digital library as well as portal which link the world's invaluable resources of libraries, museum, and archives together*. It started with its own rich digital image resources on the First Emperor of China's 7000+ terracotta warriors and horses in the ancient capital of China, Xian, and has now expanded to include many world rare and unique treasures through its aggressive collaborative as well as community building efforts. In addition, it also provides instant access to over 2400 digital collections in the world from over 80 countries, and most of which are rare books and manuscripts collections. This paper will show how Global Memory Net has enhanced the cultural and technological exchange between the West and the East in a way not possible before.

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* Global Memory Net was launched for universal access in the end of June 2006. One can log in with the URL, http: //www.memorynet.org/.

INTRODUCTION

The background, technologies used, and the innovative system (i-M-C-S) developed, basing on user-oriented conceptual framework, for the Global Memory Net has been described in another paper presented at this meeting [Chen, 2006] thus will not be repeated here again. However, it is most relevant and timely to present this paper at this section due to its extensive global content coverage of rare collections as well as its instant universal access and sharing of these invaluable resources.

RARE COLLECTIONS FROM THE EAST AND WEST

In addition to the invaluable rare collection on the First Emperor of China's terracotta warriors and horse, Global Memory Net has many other invaluable rare collections. Just to name a few from our collaborators from or on the East, these include:

- Numerous rare and unique manuscript and map collections of the Asian Division of the US Library of Congress:
    - LC's Naxi manuscripts
    - LC's Chinese ancient maps
    - LC's rare Japanese Inoh maps
    - LC's Ukiyoe collection

- The UNESCO's Memory of the World images from its over 90 collections, as well as its Arab and Islamic Manuscripts,

- Japanese ancient and rare waka poems and maps at the Tsurumi University in Kawasaki, Japan,

- Vietnam Museum of Ethnology's 54 minority ethnic groups' images,

- Hainan's minority groups' (specifically Li) images from one of the most authoritative and comprehensive manuscript from Hainan, China,

- Etc.

As shown in Figure 1 of the latest Global Memory Net's brochure, each of the sample images shown is an invaluable rare collection of either manuscripts or artifacts from different parts of the world.
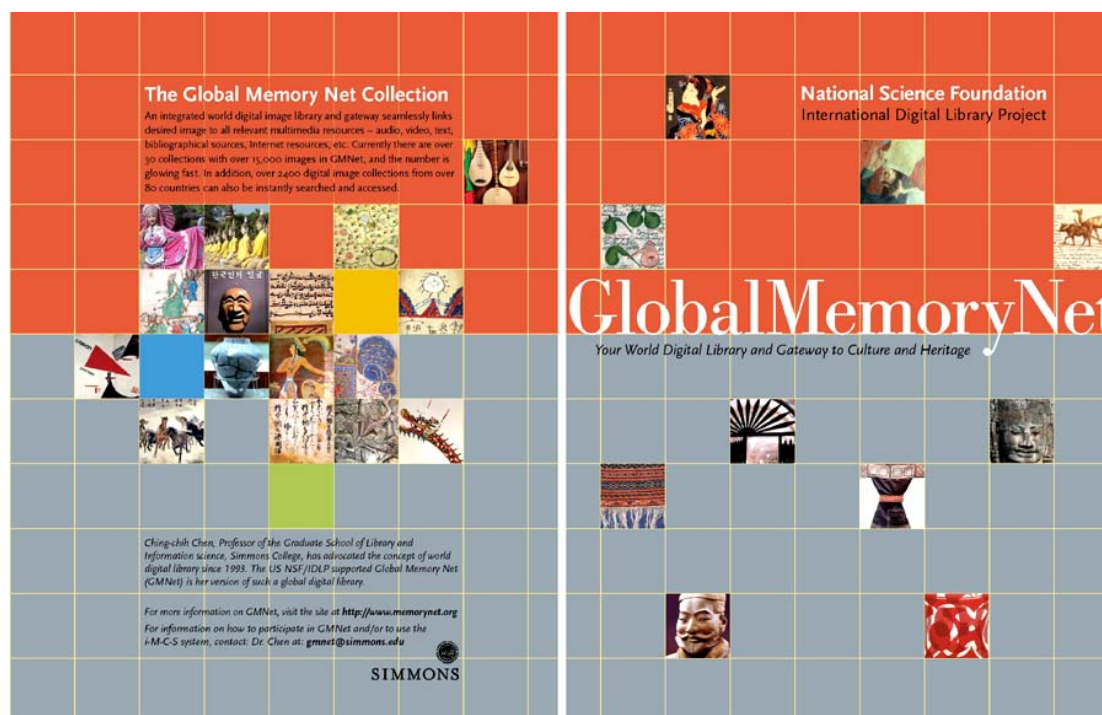
Figure 1. Brochure on Global Memory Net

In addition, Global Memory Net has also carefully selected over 2400 world digital collections, which include a large number of invaluable rare collections from both the East and the West. It also provide access to 230 some national libraries, and less than half of which are engaging in using new technologies for creating their own digital collections. These collections are also accessible through Global Memory Net.

CULTURAL EXCHANGE VIA GLOBAL MEMORY NET'S *i*-M-C-S SYSTEM

Through the successful development of an integrated multimedia content system (i-M-C-S) as well as utilizing the cutting-edge content-based image retrieval techniques, the image collections of Global Memory Net and its collaborators, as well as the home pages of over 2400 world digital collections can be searched instantly and relevant multimedia resources as well as descriptive information can be further retrieved. Instead of the traditional web-page presentations, the values of the old and rare collections have been greatly enhanced in Global Memory Net. In addition, the ability to enable both the retrieval and display of these resources in multilingual way is also of paramount importance.

While readers of this paper are referred to [Chen, 2006] for the challenges in developing such a dynamic and user-oriented system, we shall graphically show in the following how Global Memory Net (is presenting a few selected rare collections from both the East and the West:

Figure 2. Home Page of Global Memory Net

Clearly, the most important navigational panel is the left blue one showing how a user can search and retrieve what he/she wants from any one or all of the collections. It also shows that a user can access the collections by geographical locations.

Not repeating on what is already covered in [Chen, 2006], we shall use the following two examples to elaborate on features of Global Memory Net and its ability to enhance cultural exchange and utilization.

Emperor Collection

The **Emperor Collection** consists of more than 4000 selected images from Chen's interactive videodisc and multimedia CD-ROM, entitled *The First Emperor of China* on the Emperor's 7000+ terracotta warriors and horses. This large number of raw resources has proven to be invaluable to form the core collection of Global Memory Net. The interactive videodisc and multimedia CD are part of Dr. Chen's earlier PROJECT EMPEROR-I, which was supported by the US National Endowment for the Humanities (1983-1986). In addition, the collection has grown rapidly since 2000 to include additional 1000 new images collected from different sources including on-site photos taken at various museums and cultural sites in Xian and elsewhere in China, as well as those relevant to the subject. Some of them are taken from

publications with permission. In addition to images, some of the digital videos from the original PROJECT EMPEROR-I products are included. More will be added whenever possible. The **Emperor Collection** serves as a model for integrating multi-format resources from museums, archives, libraries and personal resources. [http://memorynet.org]

Figure 3 shows how 5000 images related to this collection can be retrieved easily with either traditional retrieval methods by any metadata field (Step 1), or can be explored by asking the system to display images randomly (Step 2). This expands one's knowledge on the subject
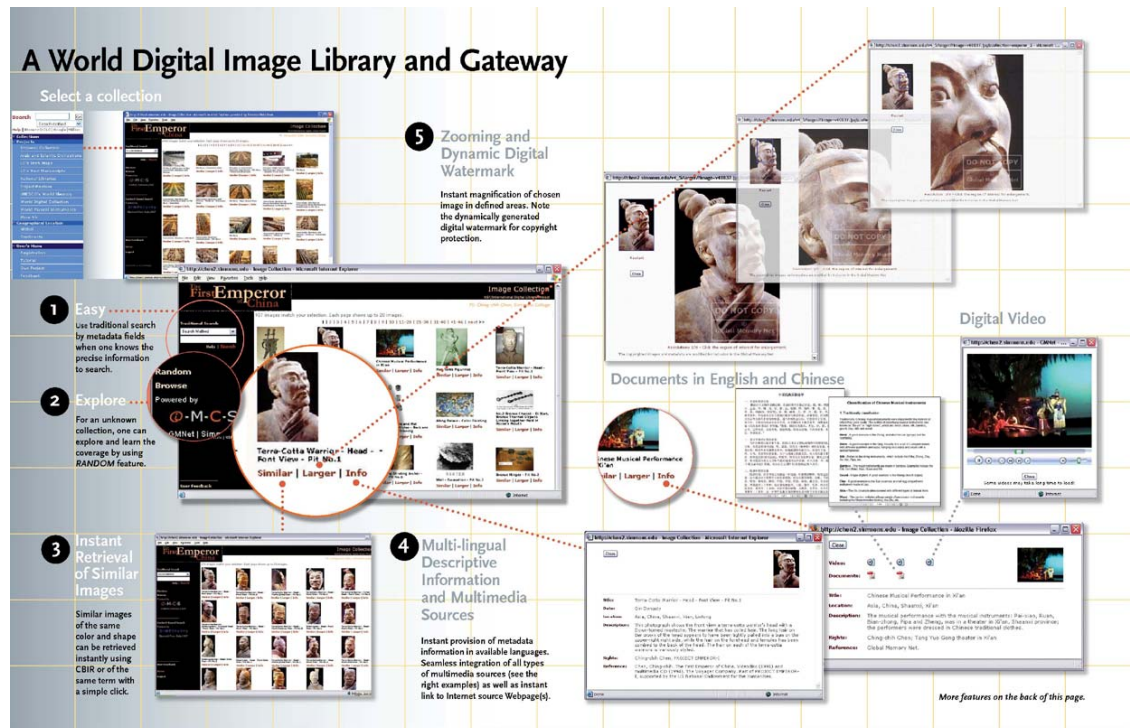

Figure 3. Some of the features of Global Memory Net

quickly. Once a desired image is spotted, one can instantly locate all the images of similar color and shape, using the cutting edge content-based image retrieval (CBIR) technique, SIMPLIcity, developed by our collaborator, James Z. Wang of Penn State University as shown in Step 3 of Figure 3. One can then select an image of interest, ask for either information about the image (i.e., metadata at this point will be shown) as shown in Step 4. The information can be in other languages other than English. If the source is provided in URL format, one can go to the website instantly. Furthermore, if there are multimedia sources available in either digital video or sound or PDF format, one can retrieve any of those instantly.

Or, if one would like to see the chosen image enlarged, the zooming images in different levels can be shown instantly as in Step 5. At this point, we will see that digital watermark will be dynamically generated as the image is zoomed at different levels. This protects the intellectual property of the content owner and copyright.
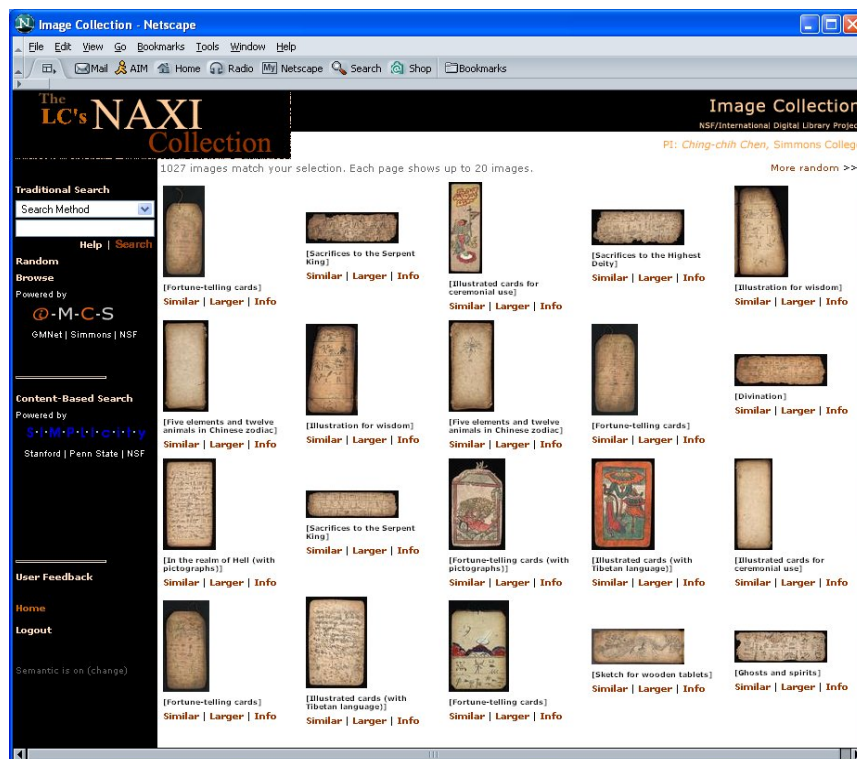
LC's Naxi Manuscripts

Naxi Manuscripts is a collaborative project between Ching-chih Chen and Dr. Hwa-wei Lee, Chief of the Asian Division of the US Library of Congress (LC) and Global Memory Net. The collection of 3,342 Naxi manuscripts features ceremonial writings of the Naxi people of Yunnan Province, China. This *Naxi* collection is the largest one outside of China and is unrivaled in quality, quantity, and variety among Naxi collections in Europe, the People's Republic of China, and Taiwan. It contains many unique examples of the only living pictographic language in the world today. Naxi pictographs differ from Chinese characters in that they appear more like Egyptian or Mayan hieroglyphs, with many recognizable figures of animals and objects. Because of the uniqueness of the language, studying the manuscripts can be quite difficult for scholars. The online presentation at the Library of Congress features 185 manuscripts, a 39.5-foot funerary scroll, and a collection of over 1,000 images with annotated information provided by the LC Asian Division. [http://memorynet.org]

This unique collection is essential to education and research, but most of them are not accessible due to distance, form, and technical barriers. In collaborating with Ching-chih Chen, this valuable collection of images with extensive metadata and annotations is added as a part *Global Memory Net*, which provides new ways for academic users to access and exploit these significant research images via a global network in a way not possible before.

Although Naxi is known to many subject specialists in Asian studies as well as a good number of Chinese, it is generally not know to others. Thus, when one is totally unfamiliar with the subject, it will not be possible for him/her to know what author, title, or keyword to use to search for needed information or image. In this case, the only way to help the user is to enable him/her to browse the image collection. Figure 4 provides random access to images of Naxi Manuscripts. If one is curious about the colorful image on the third row, one notices that it is "illustrated

card with Tibetan language." In this case, one can ask the system to provide all similar images of the same color and shape (1), as well as the different enlargement derivatives (2,3) and meta-data information (4) as show in Figure 5.

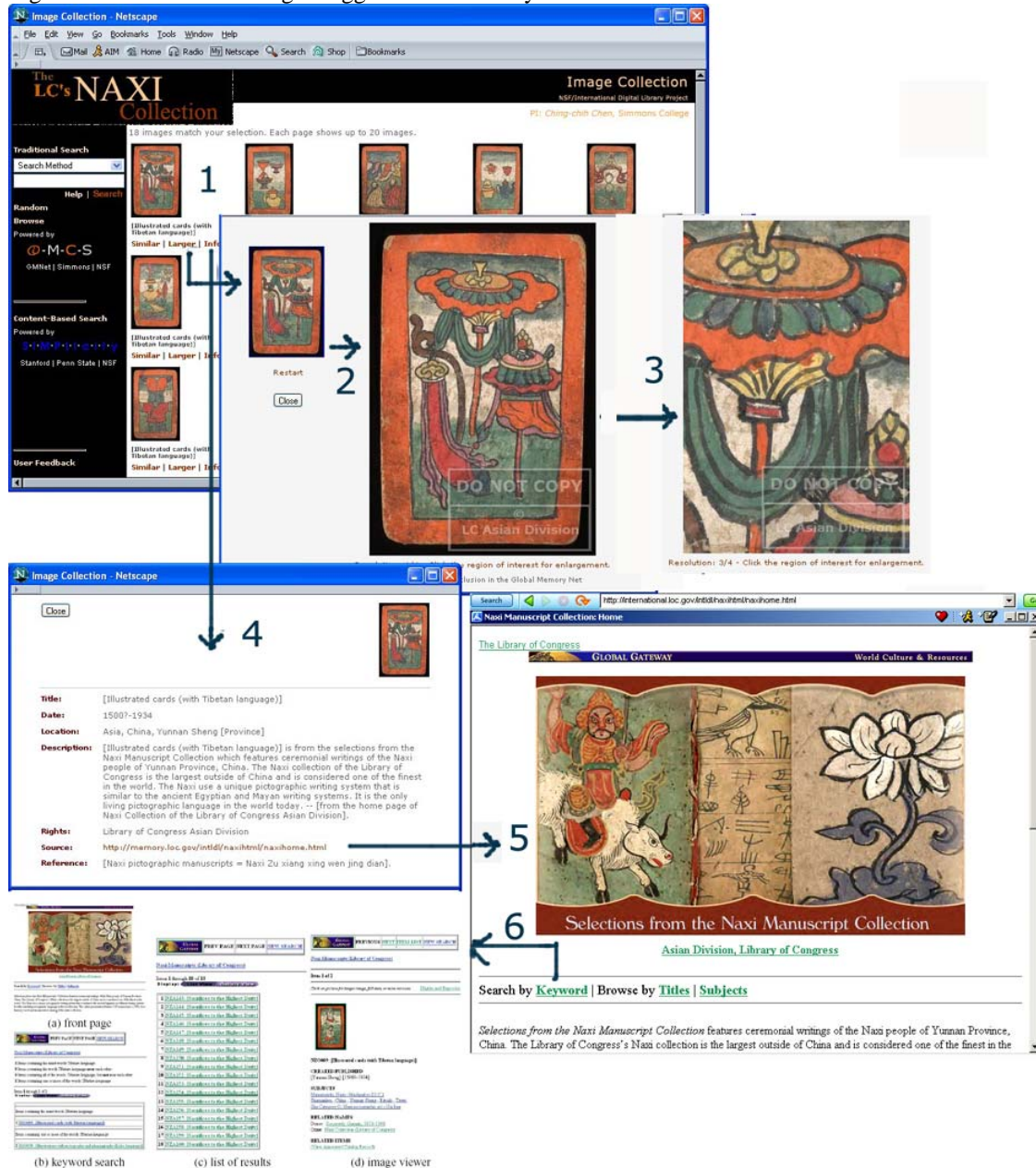Figure 4. Random Naxi images suggest numerous keywords from titles…

Figure 5. Random exploration of the chosen Naxi image to the use of the Library of Congress' site

Note that the URL of the Library of Congress's home page of Naxi is indicated in the "Source" of Figure 5. Thus, one can go that site instantly (5). At this time, with the knowledge gained by the random exploration, one will be able to use the traditional search by "keyword", "Title" and "Subject" and retrieve more information from the Library of Congress site (6).

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In addition to the above two specific examples, the oral presentation will provide more elaboration on other features related to any aspect of the following through more discussions of other rare collections in Global Memory Net:

- The use of digital videos and sounds, as shown in the collection of the World Musical Instruments, and the Tsurumi Collection,
- The multilingual capabilities, as shown in Thai Memory, the Collection of the Vietnamese Ethnological Museum, etc.
- The physical preservation and restoration of rare art objects, as shown in Figure 6 of the Project Restore in collaboration with Prof. Piero Baglinoi of the University of Florence.

Figure 6. Project Restore shows how valuable damaged artifact is restored with
nano-particle chemistry technology

- The single collection and multi-collection retrieval.
- The use of the world information resources to provide further in-depth knowledge on a selected subject.
- The geographical access to rare books/manuscripts and artifact collections
- The world digital rare books and manuscripts collections from over 80 countries
- Global Memory Net and UNESCO's Memory of the World
- The possibility for rare books and manuscripts specialists to create their own projects for teaching and research use with the images from Global Memory Net

CONCLUSION

In another paper at this meeting, we have shown how new technologies have been uses to bond the past and the present together. Since its beginning in 2000, this National Science Foundation's International Digital Library Project, Global Memory Net, has expanded to be an effective world image digital library as well as a global

gateway to the world culture, history and heritage [Chen, 2006]. It is now available for universal access. With a simple click of the mouse, citizens in the world can enjoy the world cultural, historical and heritage treasures instantly. Thus, Global Memory Net has provided a model for dynamic information provision, and international collaboration. It has integrated materials from many cultures, and has enabled cross-culture and cross-discipline studies in a way not possible before!

This paper has shown how Global Memory Net has enhanced the cultural and technological exchange from the East to the West, and the West to the East specifically in the rare books and manuscripts and rare artifact areas. Its value to rare books and manuscripts specialists should be evident. While technology is the tool enables us to provide innovative information use and services not possible before, content should be the central focus to all digital library activities. We will continue to expand our collaborative effort, and welcome your use of Global Memory Net and your participation.

REFERENCE

Chen, Ching-chih. "Using Tomorrow's Retrieval Technology to Explore the Heritage: Bonding Past and Future in the Case of Global Memory Net," presented at Information Technology with Audiovisual and Multimedia and National Libraries**:** *Part 2:* New Access Technologies: Tomorrow's Retrieval (ITS), No. 97, at the *72nd IFLA General Conference*, Soeul, Korea, August 21, 2006. http://www.ifla.org/IV/ifla72/papers/097-Chen-en.pdf

Ching-Chih Chen is Professor of the Graduate School of Library and Information Science, Simmons College, Boston, and is a consultant and speaker to over 40 countries. She is the author/editor of more than 35 books and over 200 journal articles in areas of new information technologies, such as global digital libraries, multimedia technology, digital imaging, interactive videodisc technology, global information infrastructure, information management, and information resources, etc. She produced the award winning interactive videodisc and multimedia CD entitled *The First Emperor of China*, supported by the US National Endowment for Humanities (NEH). Currently she is leading two major NSF/International Digital Library Projects (IDLP): (1) Global Memory Net, a gateway to the world cultural, historical, and heritage multimedia resources, with collaborators from different part of the world, and (2) International Collaboration to Advance User-oriented Technologies for Managing and Distributing Images in Digital Libraries. She is also co-PI, with Prof. Raj Reddy of Carnegie Mellon University, of the China-US Million Book Digital Library Project.

Photo
credit: Justin Kn

A Fellow of the American Association for the Advancement of Science, she was appointed by President Clinton in February 1997 to serve as a member of the U.S. President's Information Technology Advisory Committee (PITAC). PITAC was established by a new Presidential Executive Order. Under both Presidents Clinton and Bush during 1997 to December 2002, she co-chaired the PITAC Subcommittee on International Issues, and was a member of the PITAC Subcommittees on Next Generation Internet (NGI) and IT*2 Initiative Review; and Panels on Digital Divide, Digital Library, Learning of the Future, and Individual Security. She also chaired the PITAC's activity on Digital Divide for Smaller Institutions. During 1987 to 2001, Dr. Chen was Chief Organizer of a series of 12 International Conferences on New Information Technology (NIT) in many continents of the

world. The outcome of NIT '99 (Taipei) and NIT'2001 (Beijing) are the two-volume books related to the development of Global Digital Libraries – *IT and Global Digital Library Development* (1999) and *Global Digital Library Development in the New Millennium: Fertile Ground for Distributed Cross-Disciplinary Collaboration* (2001). She is a recipient of many major awards, and was also elected in 1985 as Fellow of the American Association for the Advancement of Science. She served as an Honorary Professor of Tsinghua University in Beijing from August 1999 to 2002 and University of Hainan, China since 2004. Active in the digital library area she was the co-Chair of the 4th ACM/IEEE Joint Conference on Digital Libraries (JCDL) of 2004 held in Tucson, Arizona in June 2004. She was on the Advisory Board of DELOS (the European Digital Network for Excellence), serving as the US Co-Chair of the NSF/DELOS Working Group in Digital Imagery for Significant Cultural, Historical and Heritage Materials, and served as the co-editor for the *Journal of Digital Library*'s Special Issue on Multimedia Contents in Digital Libraries (February 2006). A sought-after international speaker, in the last two years alone, she delivered keynote speeches and made presentations at many international conferences including those in Delhi and Bangalore, India; Dubrovnik, Croatia; Buenos Aires, Argentina; Beijing, Shanghai and Hangzhou, China; Kawasaki, Japan; Tainan, Taiwan, etc. She is on the advisory board of the major China Digital Library Project of the National Library of China; in October 2005, she was appointed as a consultant to OCLC for its Global Digital Initiative (http://www.oclc.org/news/releases/200520.htm); and receivedthe coveted LITA/OCLC Kilgour Award from the Library Information Technology Asso-ciation in June 2006 (http://www.ala.org/ala/pressreleases2006/april2006/2006KilgourAward.htm).