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FROM THE KEYBOARD OF

brian e.c. schottlaender

As I've communicated previously, the Library—over the last few years—has been consolidating library facilities, services, and print collections in response to changes in how our services and resources are used and to accommodate our reduced staff size and our smaller footprint on campus. The Library has also been going through an internal restructuring, a process that began last year and will continue through fall 2013.

As part of this restructuring, effective June 30, 2013, we will be consolidating our remaining discipline-based libraries into our new organizational structure. Those libraries within the Geisel building—Arts, Science & Engineering, and Social Sciences & Humanities—as well as the Biomedical Library, are all becoming part of a single library structure, now known as the “UC San Diego Library.”

While these discipline-based libraries will no longer function as separate units, our faculty, students, and other users will continue to have access to many of the services and resources—both physical and digital—that they have come to expect from the Library. Although some staff reassignments have been and will continue to be made, library staff will continue to support campus teaching and research with expert and subject-based support and advice.

In the summer of 2011, the Library embarked on a three-year effort to consolidate our print collections, with the goal being to retain on campus the materials that are most actively used and needed to support current instruction and research. Feedback from our faculty users has been essential to our consolidation efforts, which are still underway.



You can read about our progress in the update on the next page. Also in this issue, we are pleased to present a Q&A with Chancellor Khosla and my essay on the ecosystem approach to digital preservation.

With best regards,

Brian E. C. Schottlaender

The Audrey Geisel University Librarian

Brian Schottlaender on The Digital Preservation Imperative: An Ecosystem View

As the information universe becomes increasingly digital, there is a growing need to preserve the digital assets that represent the intellectual capital of scientific disciplines, educational communities, and government and cultural agencies. This need is both quantitative and qualitative in nature. On the one hand, digital resources—particularly digital data—are proliferating at a staggering rate. [According to IDC, the International Data Corporation, the amount of data worldwide grew 48% between 2011 and 2012 alone—to 2.7 zettabytes, or 2.7 billion terabytes.] On the other hand, digital resources are qualitatively different from analog (print and media) resources. How so? Two reasons: fragility and complexity.

Digital information resources are fragile in ways that analog information resources are not, largely because they are far more dynamic. That is:

- they are easily and often revised or updated, linearly (v. 1.0, v. 2.0, v. 3.0, etc.) or cumulatively;
- they may be available in various “views;”
- they are more easily altered by someone other than the original creator;
- they are more easily corrupted over time;
- the storage media on which they reside have far shorter life spans than do analog storage media (however passé it may be, paper—at least most of it—is pretty durable).

The most immediate and significant consequence of this dynamic nature of digital information resources is that their preservation requires a much more active process than that required for analog resources. Passive preservation—“put it someplace cold and dark and throw away the key”—simply won't work in the digital environment. On the contrary, the

bits have to be kept moving and need to be checked and re-checked to ensure that they don't become compromised or simply drift off into the ether.

Digital resources are not just more fragile than their analog counterparts—they are also more complex. In the analog world, a book seems to be a wonderfully simple thing. Scan it into digital form, however, and it instantly becomes a “complex digital object,” full of individual digital elements (i.e., pages) that need to relate to each other in a certain order—an order that needs to be preserved. Moreover, it is so easy nowadays to link from one digital object to another—creating in the process an even more complex digital object that raises questions about what exactly one should actually preserve. And, some resources, like multimedia, or even basic word processed documents, are completely dependent on the software that renders them usable; others, like electronic books, on the hardware that does, as well.

While preservation has never been a single-agency undertaking, this combination of prolificacy, fragility, and complexity calls for an ecosystem approach to digital preservation, and to digital stewardship, in general. This ecosystem approach to the stewardship of digital resources includes three emerging and essential elements: access, manage-

Collection Consolidations Update

As we near the end of the 2012-13 academic year, the Library is embarking on its third year of significant efforts to consolidate our physical collections. During this time, we have continued to communicate our consolidation proposals through the Library website and, as a result, have received numerous faculty comments and suggestions. This feedback has been instrumental in helping us to determine where best to locate materials and how best to organize collections to support faculty and student research and teaching. In response to feedback this year, we have integrated the Chinese, Japanese, and Korean materials formerly in the International Relations and Pacific Studies Library with our East Asian language collection and we have decided to keep the materials currently in the Science and Engineering Library in the Geisel Library building.

Your continued feedback will also help us to meet long-term goals for library user space, including the addition of new and



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enhanced study and computing spaces. While consolidating our physical materials has been necessary to accommodate our smaller footprint on campus, an additional major objective of these efforts has been to meet the needs of students and other library users for more dynamic, flexible,

and well-equipped study and community spaces. We have taken significant steps toward this goal with the introduction of a 24/5 study commons in Geisel Library last year and the addition of new high-tech study spaces—both individual and group—in Geisel. In addition, 126 workstations were added in fall quarter, and we have added more than 260 new study seats.

Installation of Compact Shelving in Geisel

The Library is nearing completion on the installation of compact shelving on the first floor of the East Wing of the Geisel Library (the space which has been known as the Science & Engineering Library). In a move which began this spring and will continue through the summer, the Library plans to consolidate into this shelving a continuous run of the current bound journal volumes from the Geisel and Scripps collections. The journals currently housed in the Biomedical and Arts Libraries will remain there at present. Phase one of the compact shelving will continue to house monographs in the Q-Z call number ranges, including the Scripps materials. As we've communicated previously, we will be proposing that journal volumes older than 1990 continue to be stored and shelved in the offsite Library Annex, where they can be paged and/or articles from them can be scanned as requested. Since some faculty expressed concern about access to those pre-1990 volumes that have a high usage rate, we are planning to keep on site—on an exceptional basis—those pre-1990 titles that demonstrate a high rate of usage. We have also been actively acquiring more digital backfiles for many of our journals in all disciplines. By the end of the summer, we will be sharing a list of these substantial acquisitions.

We believe that these strategies will improve collection services to our patrons. We are hopeful that this next phase of our collections consolidation and expanded digital access projects will improve collection services to our patrons. While some physical journal volumes may not be immediately available when they are in the process of being moved, we hope the expanded digital access and accurate catalog indicating the status of materials being moved, will provide you with effective access to anything you need.

ment, and preservation. While curators tend to view this ecosystem as a cycle, technologists see it as more of a stack. Regardless of how one views it, the components are by and large the same.

Following are some examples of each ecosystem element:

- The access component is manifest in portals like PRL, the Pacific Rim Library, developed by the UC San Diego Library-founded Pacific Rim Digital Library Alliance: <http://prl.lib.hku.hk/exhibits/show/prdla/browse-collections>; Calisphere, developed by UC's California Digital Library: <http://www.calisphere.universityofcalifornia.edu/>; the newly announced DPLA or Digital Public Library of America, developed by a coalition of libraries led by Harvard: <http://dp.la/>; and others.
- The management component is exemplified by DSpace, developed by MIT; Fedora, developed by the University of Virginia; DAMS or the Digital Asset Management System, developed by the UC San Diego Library; and others.
- The preservation component is well-represented in Chronopolis, developed by UC San Diego, the University of Maryland, and NCAR (the National Center for Atmospheric Research); HathiTrust, developed by UC and the University

of Michigan; the Academic Preservation Trust, under development at the University of Virginia; and others.

These ecosystem elements all have multiple and variable relationships with one another. Some of the UC San Diego content managed in DAMS, for example, is syndicated—for discovery purposes—in Calisphere, and replicated—for preservation purposes—in Chronopolis.

The newest player to emerge in the ecosystem is DPN—the Digital Preservation Network—led by UC, the University of Virginia, the University of Michigan, the University of Texas, and Stanford. DPN (“Deepen”) was conceived as a backbone for uniting and providing common services to the preservation elements of the ecosystem, including services like transmission, replication, auditing, and succession. Like Internet2, moreover, DPN is conceived as being of, by, and for the academy. As such, it is a direct response to the “increasingly pressing need to preserve the digital assets that represent the intellectual capital of scientific disciplines [and] educational communities” that served as the point of departure for this essay.

Pradeep K. Khosla

Chancellor



Pradeep K. Khosla, a world-renowned electrical and computer engineer, was appointed UC San Diego's eighth Chancellor and a Distinguished Professor in August 2012. At UC San Diego, he has initiated a comprehensive strategic planning process to develop a unifying vision and shared goals for the future of the campus. Khosla previously served as Dean of Engineering at Carnegie Mellon University. There, he set the strategic direction for undergraduate and graduate education and research, and was elected University Professor, the highest distinction a faculty member could achieve.

Khosla is an elected member of the National Academy of Engineering, the American Society for Engineering Education, and the American Association for Advancement of Science, among others. He is the recipient of numerous awards for his leadership, teaching, and research, including the 2012 Light of India Award, a Lifetime Achievement Award from the American Society of Mechanical Engineers, and the George Westinghouse Award. In 2012, he was named as one of the 50 most influential Indian-Americans by SiliconIndia. He received his bachelor's degree in electrical engineering from the Indian Institute of Technology, and his master's and doctoral degrees in electrical and computer engineering at Carnegie Mellon.

Q You've now been leading the University for 8-9 months. How are you acclimating to the UC system and UC San Diego? Any surprises that you've encountered so far?

A UC San Diego is home to many brilliant, collaborative people – faculty, staff and students – and I am grateful for the warm welcome that they've given me. I think that helped me to acclimate very quickly. I wouldn't say there have been surprises, but I've certainly learned a lot. UC San Diego is larger than some cities. We have six undergraduate colleges, five academic divisions, and five graduate and professional schools. We are also home to the world-famous Scripps Institution of Oceanography, the UC San Diego Health System, which includes two hospitals and several outpatient centers, and the top-ranked UC San Diego Library. The more I learn, the more impressed I am with our people and our work.

Q One of your first significant initiatives was to launch a strategic planning process. Could you update us on where we currently are in the process?

A We've completed all of the information we gathered at our Town Hall meetings, and through the surveys, interviews and online comments. We're now working to finalize our mission statement, our overarching values and strategies, and our measures of success. Many of the unit-level strategic planning processes are also underway.

I'm very excited about this process.

By developing a unifying vision and shared aspirations and goals for our campus, we are essentially creating a roadmap for our future, so we can continue our amazing research and education, serve the citizens of California, provide advanced care and the latest treatments and therapies for our patients, and tell our story to our community and our world.

Q The strategic planning process has included some provocative brainstorming questions, including whether or not the university's degree programs meet the needs of today's students and what things you would do to improve

UC San Diego if you were chancellor. Have you received any equally provocative answers to these questions? Any surprises?

A We've received some great answers and suggestions, which you can read about at <http://plan.ucsd.edu>. The ideas that have been submitted range from increasing interdisciplinary degrees for undergraduates to adding more parking on campus. I truly appreciate all of the feedback and I want to assure the campus and community that we are taking each comment into consideration.

Q Every year, the Library gives out awards to outstanding undergraduates who have completed notable research projects with faculty. Increasingly, learning how to conduct research under the auspices of a faculty member is being perceived as a major benefit for undergraduates at research universities. Do you think this is a high enough priority for faculty members? Are enough undergrads engaging in this opportunity?

A I'm pleased that the number of undergraduates participating in research continues to increase, and it's something we actively encourage. We want our students to have an opportunity to engage in some form of research during their undergraduate years at UC San Diego. It helps to build open-ended, problem-solving skills, and it promotes group work.

The role of our faculty, post-docs and graduate students are all important in undergraduate research and also the overall student experience. In addition to imparting knowledge in the classroom or laboratory, they can also help guide students on their academic and future career paths.

Q In the last year, there has been increasing pressure on academic institutions to offer online education courses or MOOCs. How is UC San Diego responding to this pressure? What kind of a role do you think online education might play at an institution like this?

A I believe that we are at the beginning of a revolution that will augment (and not replace) the academic enterprise and allow it to be more responsive and impactful in educating current and future generations. Information technology democratizes the process of content creation and

Perspectives

Thomas Levy on Cyber-Archaeology



Thomas Levy, a Distinguished Professor of Anthropology, is director of the UC San Diego Levantine Archaeology Laboratory, a data curation pilot project of the University's Research Cyberinfrastructure initiative. The lab is a joint program of the Center for Interdisciplinary Science for Art, Architecture, and Archaeology (CISA3) at the Qualcomm Institute for Telecommunications & Information Technology.

For more information about RCI: <http://rci.ucsd.edu/services/data-curation.html>; for more information about the Levantine Archaeology Laboratory: <http://cisa3.calit2.net/arch/index.php>

UC San Diego has been excavating in Israel and Jordan since 1993, as part of the campus' Levantine Archaeology Laboratory. We have accumulated huge collections of material culture from sites spanning a 10,000 year period—much of which is stored on campus. The early years of field work involved using traditional hand-held devices like theodolites, builder's levels, and tape measures, with all data recorded by hand on graph paper and notebooks. In 1997, I began a 'deep-time' study of the role of mining and metallurgy

in southern Jordan's copper ore rich Faynan region, about 50 km north of the Dead Sea. Our research has examined how the control of metal production influenced social change from prehistoric to Medieval Islamic times. Situated in a remote desert zone with poor connectivity, and far from our home-base at UC San Diego, I decided in 1999 that our team had to 'go digital' and work toward a paperless recording and archiving system, so that

The cyberinfrastructure project has forced our lab to grapple with the complexity of how to make data readily available to the public in easily digestible and accessible formats. By working with the UC San Diego Library, we are making our digital data and results a part the Library's collections.

all data could be brought home in digital form at the end of each expedition season. Going digital, which requires recording all field data with precise x, y and z coordinates with GPS and similar systems, means that our work has been 'pre-adapted' for collaboration with computer scientists and engineers, where we take advantage of the latest advances in cyberinfrastructure. Thus, the RCI (Research Cyberinfrastructure) pilot project was a natural fit for us, providing a pathway to facilitate the dissemination of our data on-line and beyond traditional print media.

The cyberinfrastructure project has forced our lab to grapple with the complexity of how to make data readily available to the public in easily digestible and accessible formats. By working with the UC San Diego Library, we are making our digital data and results a part the Library's collections. Our team, led by my anthropology graduate student, Aaron Gidding, and the Library's Brad Westbrook, has coordinated building the needed cyberinfrastructure. This has led to two major considerations for data management that are coming to fruition. Firstly, this

has required that we determine exactly how data is organized within our current data infrastructure in order to keep things legible for outside users. Secondly, it has forced us to undertake the reorganization of some of our legacy data, which was very haphazardly organized in the early years, in order to have it ready for ingestion. This kind of guidance from the RCI team provides our workgroup with a model for how data organization should proceed into the future, as we both collect more data and continue to curate our own legacy data collection. The system is based on "digital object" identifiers, which facilitate vast data searches in online library systems around the world. It is designed to be both hyper-robust with very secure backups, in addition to being readily available as digital objects through the UC San Diego Library website. This year, the UCLA Cotsen Institute of Archaeology will publish two large volumes that summarize our Biblical Archaeology research in Jordan. The RCI project will host the major digital database from that study, that includes over 40,000 photographs, hundreds of thousands of artifacts, laser scan files, and more — all hosted in a geo-spatial database.

If you have a perspective you'd like to share in this column, we'd love to hear from you. Contact Dolores Davies at ddavies@ucsd.edu or call x40667



consolidations continued...

Q&A continued...



Transfer of Scripps Materials to Geisel Library

In July 2012, following the closure of the Scripps Institution of Oceanography Library, we initiated efforts to consolidate the Scripps print collections into the Geisel Library. That major endeavor, which has involved the moving of approximately 150,000 books as of April, 2013, is expected to be completed by fall of 2013. Until that effort is completed, Scripps materials can continue to be paged from Geisel Library and delivered to the Scripps campus. As communicated previously,

the Scripps Archives and Library Annex, located on the 3rd floor of the Eckart building on the Scripps campus, will continue to provide access to Scripps special collections and archives during the week, by appointment. To make arrangements, please direct queries and questions to the Special Collections and Archives Program, (858) 534-2533.

If you have feedback on the Library's collection consolidation efforts, please send your comments to us at: <http://libraries.ucsd.edu/collections/consolidation/consolidation-qa-feedback.html>

consumption, and allows individuals to participate in ways that best suits them. Online courses are allowing universities to extend the classroom and engage bright minds around the world. It is vital that we continuously explore new avenues of education and outreach so we can continue to meet the needs of our current and future students, and ensure a strong and skilled workforce. Technology is changing and we must evolve as well.

Q What's the last really great book you read and what did you like about it?

A I just finished reading *Fermat's Last Theorem* that traces the history of mathematics and the previously unsolved mathematical problem posed by Pierre de Fermat in the 17th century. I enjoyed how the book documented the tenacity of the English mathematician, Andrew Wiles, who spent eight years working to develop the proof of the theorem, something others had tried, but could not do over the last 350 years.

Your feedback on **facultyfile** is welcome

Please send your comments and suggestions to:
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