

30 YEARS

CONSERVATION
PERSPECTIVES
THE GCI NEWSLETTER

FALL 2015

30TH ANNIVERSARY



The Getty Conservation Institute

A Note from the Director



Photo: Anna Flavin, GCI

I am privileged to be the director of the Getty Conservation Institute as it marks its thirtieth anniversary. The mission and the values it upholds have not changed since the Getty's trustees created it and its first director, Luis Monreal, assumed his seat in 1985. The need to protect, preserve, and conserve cultural heritage is as relevant and critical now as it was when the GCI was founded. Indeed, for a variety of reasons it could easily be argued that the needs in our field have only increased in the intervening thirty years.

If the GCI has been successful and had an impact, it is because of the vision and courage of many people from within the Getty and without. It is fitting that Otto Wittmann, a member of the Monuments Men (the World War II unit that endeavored to protect and retrieve cultural heritage during and after the war), planted the seed that would grow into the GCI. Wittmann—a former director of the Toledo Museum of Art and a Getty trustee—was the first to commit to paper the idea that the Getty should devote some of its substantial resources to an institute dedicated to the conservation and scientific examination of works of art. His notion was embraced by other Getty trustees and then robustly advanced by the trust's founding president, Harold M. Williams. The GCI was born. Throughout its short history the Institute has been the beneficiary of

such visionary trustees, advisers, and colleagues, generous collaborators and partners, and a remarkable and committed staff.

Today the GCI is a part of the worldwide ecosystem of conservation. Each element of this ecosystem—which includes a wide variety of institutions and professionals—contributes to the collective goal of protecting and preserving the world's cultural heritage through the education of conservators, the establishment and implementation of policies, advocacy to save threatened places, scholarship to create new methodologies, and science to forge new treatments. As a member of this international community, the GCI has evolved to meet changing needs, resources, and technologies, always emphasizing service to the field.

This special edition of *Conservation Perspectives* seeks not only to chart the GCI's growth and accomplishments, but also to put the Institute's thirty years of work into the broader context of the conservation field's own development during this period. In her feature article, Jeanne Marie Teutonico, the GCI's associate director for programs, traces the movement of the Institute toward an increasingly holistic view of conservation and an integrated approach to conservation practice—an evolution that in many ways mirrors developments in the field as a whole.

In the articles that follow, authored by GCI staff and conservation colleagues, six major areas of Institute work are examined: conservation science, conservation and management of archaeological sites, preventive conservation, earthen architecture, decorated surfaces, and modern and contemporary art research. Each area is one to which the Institute has committed considerable resources and, in the case of most, decades of work. Our efforts in these areas constitute a significant portion of the GCI's investment in, and impact on, the field to date.

While the GCI, in certain respects, is still a young institution, it has, I believe, made an important contribution to enhancing the practice of conservation and to supporting our colleagues engaged in that work. That is our mission, one to which we were dedicated in the past, and one to which we will be dedicated in the future.

Each of us at the GCI thanks you—our partners, colleagues, and friends—for your efforts to protect and conserve the world's cultural heritage, and we look forward to continuing our collaborative work to preserve that heritage for the benefit of civil society.

A handwritten signature in black ink, reading "T. Whalen". The signature is fluid and cursive, with a long, sweeping underline that extends to the right.

Timothy P. Whalen

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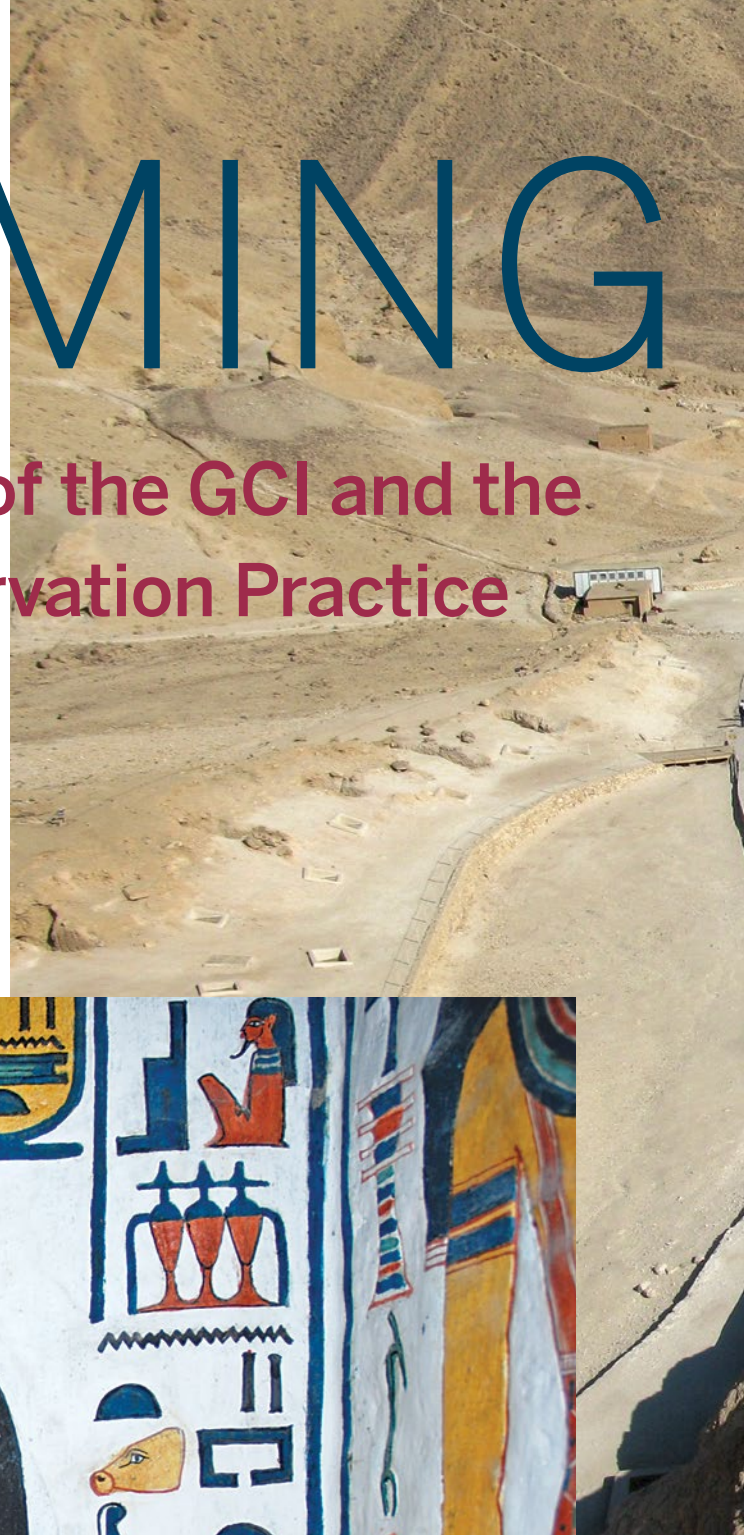
ON THE COVER

The Getty Conservation Institute's Information Center at dusk.

Photo: J. Paul Getty Trust.

COMING

A Reflection on the Work of the GCI and the Evolving Nature of Conservation Practice



The evolution of GCI work in Egypt reflects the adoption of a more holistic approach to conservation. GCI field projects began in the 1980s with conservation of the wall paintings in the Tomb of Nefertari and continued more recently with development of a conservation and management plan for the Valley of the Queens, where the tomb is located. Left: A wall painting in Nefertari's tomb. Photo: Martha Demas, GCI. Right: A broad view of the Valley of the Queens. Photo: Will Reynolds, GCI.

OF AGE



BY JEANNE MARIE TEUTONICO

Anniversaries are cause for celebration, but they also provoke reflection on all that has come before and all that might lie ahead. As the Getty Conservation Institute turns thirty, it is fitting to reflect on our own history and accomplishments but also on the ways that the conservation field has evolved more generally in this same period.

The political, social, economic, and technological developments that have characterized the latter part of the twentieth and early years of the twenty-first centuries have created an increasingly complex context for the understanding and conservation of cultural heritage and have provoked evolution in both thinking and practice.

Today, conservation is generally understood to mean all the processes of looking after an object or a place so as to retain its cultural significance.¹ It is not simply about technical solutions or individual objects but about an integrated approach that includes planning and management and a consideration for the larger historic environment, be that a place or a museum collection.

All of this demands a long-term view and sensitivity to economic imperatives but also an understanding of what is

significant and to whom, and how that significance is vulnerable to loss. This does involve attention to the retention and repair of physical fabric, but not divorced from the cultural, social, and economic forces that both created it and continue to affect the way it is used, valued, and cared for. Public participation and dialogue are essential components of the process, as are various kinds of research and an interdisciplinary approach to problem solving. Understood this way, conservation is not so much about preserving vestiges of the past as it is about the dynamic management of change and the continuity of transformation that all objects and places undergo through time.

In many ways, the work of the GCI in the past thirty years has evolved to reflect this increasingly holistic view of conservation and an integrated approach to practice. Before turning to a more detailed consideration of this evolution, it is worth reflecting on the place of the GCI in the context of other conservation organizations.

THE GCI IN CONTEXT

In many ways, the Getty Conservation Institute is unique among institutions dedicated to the conservation of the world's cultural heritage. Though there are a variety of organizations today that, to varying degrees, conduct conservation-related activities and share similar goals, their specific structures, aims, mandates, and approaches differ widely from each other and from those of the GCI. Unlike inter-governmental organizations, the GCI has no member states to set its agenda. Unlike national organizations, it has no sites or collections to maintain, no geographic boundaries, and no political mandate. The GCI is not a membership organization, so it has no constituency other than the profession. Though the J. Paul Getty Trust does

have a grant-giving program in the Getty Foundation, the GCI does not provide funding for projects or engage in advocacy. And while education is a central part of the Getty's mission, the Institute does not confer degrees or provide entry-level training for conservators.

In brief, the GCI is best described as a private, international research institution focused on the creation and delivery of knowledge that will benefit the professionals and organizations responsible for the conservation of the world's cultural heritage. As one of the four operating programs of the Getty Trust, it is also part of the Getty's larger philanthropic enterprise dedicated to advancing the understanding, conservation, and enjoyment of the visual arts.

Since its early days, the GCI has interpreted *visual arts* in the broadest possible sense to include paintings, photographs, objects and collections, buildings, archaeological sites, and historic urban landscapes. Thus, our work deals with an extraordinary diversity of artifacts and issues, essentially with both movable and immovable cultural heritage.

The GCI has a multidisciplinary staff of about eighty professionals including scientists, archaeologists, architects, conservators, planners, and specialists in subjects such as documentation and education. However, most of the Institute's work is carried out in partnership with other organizations, extending its reach in terms of expertise, resources, and geography.

LOOKING BACK

Since its inception, the GCI has devoted itself to particular issues and areas of work that were identified as underserved or of particular importance to the conservation field. These include preventive conservation and managing museum environments; the conservation and management of archaeological sites; earthen

SELECTED GCI PROJECTS

1983–present

1983–96

PERMANENCE & APPLICATION OF CONSERVATION MATERIALS

Research on selected conservation materials—including cellulose ethers, acrylic and alkoxysilane stone consolidants, Parylene, water-borne resins, and the effects of aqueous light bleaching—that increased understanding of the properties of materials under treatment and advanced knowledge of the chemistry and physics of the agents and processes used in treatment.

1985–91

CONSERVATION OF WALL PAINTINGS

A three-year diploma course in the conservation of wall paintings, developed in collaboration with the Courtauld Institute of Art of the University of London; the Courtauld continues to offer the course, which has been transformed into a master's degree program.

1985–98

POLLUTANTS IN THE MUSEUM ENVIRONMENT

Investigated risks posed to museum collections by atmospheric pollutants and indoor-generated pollutants; also researched passive sampling devices and mitigation methodologies.

1986–92

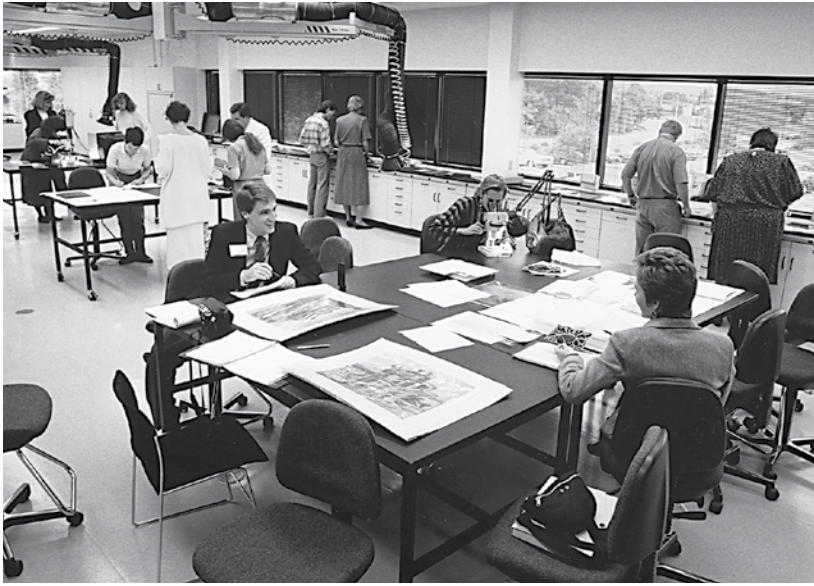
TOMB OF NEFERTARI

A collaboration with the Egyptian Antiquities Organization to conserve the 3,200-year-old wall paintings in the Tomb of Queen Nefertari and to develop a long-term maintenance plan for the tomb.

1987–93

ARCHAEOLOGICAL CONSERVATION & SITE MANAGEMENT

A series of courses and workshops for professionals to increase awareness of the need to apply basic conservation principles in the care of archaeological materials and in the management of archaeological sites.



GCI education efforts have advanced from short courses to initiatives that include course work followed by supervised periods of mentoring. Left: A one-week GCI course on preventive care of historic photos, held in October 1987. Photo: Thomas Moon, for the GCI. Right: The January 2015 concluding workshop in Beirut, Lebanon, of a Middle East Photograph Preservation Initiative course that began with a workshop in Amman, Jordan, in January 2014. Photo: Tram Vo, GCI.

building materials and technologies; photograph conservation; strategies for seismic mitigation and reinforcement of historic buildings; and the conservation of decorated surfaces, such as wall paintings, mosaics, and rock art. The trajectory of the Institute’s work in some of these areas is traced in this edition of *Conservation Perspectives*. At times in its history, the GCI was undoubtedly responding to contemporary trends in thinking and practice; at other times, the Institute has taken a more proactive role in leading change.

So what are some of the important characteristics of GCI work that reflect the evolving nature of the conservation field over the last three decades?

Surely the most overriding change has been the adoption of a more holistic approach that looks not just at a particular object or building but at the larger environmental and cultural context. In a sense, the GCI’s work in Egypt, beginning with the conservation of the wall paintings of the Tomb of Nefertari in the late 1980s and continuing more recently with the development of a conservation and management plan for the Valley of the Queens, is a microcosm of the evolution in thinking that has taken place in the conservation field. Beginning with a consideration of the individual object and a focus on its physical conservation and presentation, the GCI later worked with Egyptian colleagues to consider larger contextual issues of planning and management, an understanding

1987–94

CONSERVATION OF PHOTOGRAPHIC MATERIALS

A series of courses for curators, conservators, archivists, and others responsible for collections of historic photographs on the conservation and preventive care of photographic materials, especially historic photographs and negatives.

1987–90

CONSERVATION OF ROCK ART

A series of short- and long-term courses focused on rock art conservation, site protection, and site management that included on-site training for those responsible for the protection of rock art sites.

1988–95

ADOBE CONSOLIDATION

A long-term research project on adobe consolidation conducted at historic Fort Selden in collaboration with the Museum of New Mexico State Monuments; research identified a multistep process using three chemical procedures that effectively stabilized sections of the adobe ruins.

1989–99

BINDING MEDIA

Development of methodologies to identify binding media in paint, including a kit using medical diagnostic technology for identification of the major binding media types encountered in the conservation of ethnographic art objects.

1990–present

GCI REFERENCE COLLECTION

A repository of reference materials that can be used by the field for research in the analysis of art objects; it currently houses more than sixteen thousand samples.

1990–95

PREVENTIVE CONSERVATION

A series of courses for conservators, collection managers, and conservation educators focusing on the management of the environmental conditions under which collections are housed and used.

1990–96

SEISMIC STABILIZATION OF HISTORIC STRUCTURES

Researching and developing methods to provide seismic stabilization for historically and culturally significant buildings located in earthquake regions; a component of this work was the Getty Seismic Adobe Project (GSAP).

1990–95

SITE CONSERVATION AT THE MOGAO & YUNGANG GROTTOS

A collaboration with the State Administration for Cultural Heritage of the People’s Republic of China to research and implement site stabilization and conservation strategies at two ancient Buddhist grotto sites and to train technical staff.

of the natural, social, and political environment, and the capacity and conditions required to ensure the long-term protection of the site by those entrusted with its stewardship.

The last thirty years have also seen a greater emphasis on preventive conservation—essentially measures to manage and mitigate the risks to objects and sites—as opposed to a previous focus on remedial intervention. Some of this reflects the practical reality that repeated treatments are both costly and potentially ineffective if not carried out within a broad framework that includes environmental control and strategies for monitoring and maintenance. This trend is evident both in museums, where the concept of acceptable risk is being reevaluated in light of energy conservation concerns, and on sites, where the sheer magnitude of heritage to be preserved precludes conservation and presentation of every detail. For example, preventive measures like sheltering and reburial are increasingly important to the conservation of archaeological heritage, as are visitor management strategies that both protect the site and improve the visitor experience.

Related trends are seen in conservation science. At the GCI and in the field more generally, science has evolved from a focus on treatment and the development of new treatment materials to a more profound understanding of decay mechanisms, improvement of analytical technologies to better identify materials and understand their deterioration, and design of preventive conservation strategies like oxygen-free display cases and safer museum lighting sources. Analytical instruments have become more portable, allowing them to be brought to the object or site rather than the other way around, and there are a growing number of sophisticated noninvasive techniques that permit detailed analysis with little or no sample material. Scientists are integral members of project

teams (rather than simply the recipients of samples for analysis) and, increasingly, have specialist knowledge in both a scientific discipline (like chemistry, physics, or biology) and conservation.

Education, too, has seen significant developments at the GCI and elsewhere in the field. After an early focus on short training courses, our approach now is to think longer-term. Most current GCI training initiatives involve some type of course followed by supervised periods of mentoring during which the trainees gain confidence with new ideas and approaches and build relationships with each other and the larger professional community. Similarly, from a focus on more technical aspects of repair and treatment, GCI training initiatives now incorporate larger issues of planning and management and present a broader framework for decision making. This approach to education is more labor intensive, but it ultimately builds capacity that is sustainable in the long term, especially in parts of the world where access to specialized conservation education remains limited. In recent years, the GCI has also placed increasing emphasis on the development of didactic materials that can be used by others and has begun to experiment with new modes of delivering training, such as distance learning.

Finally, the Institute's work has also reflected recent developments in the way that information is disseminated and made available to a variety of audiences. Our commitment to traditional print publications remains strong, but in recent years we have increasingly utilized electronic media to make information more broadly accessible. This effort includes richer content on the GCI website, the continuing digitization of out-of-print publications to make them available free of charge as PDFs, and a much greater presence in social media, including a GCI YouTube channel with a growing number of videos. The Getty's founders envisioned an

1992–2008

CONSERVATION OF THE ST. VITUS MOSAIC IN PRAGUE

Developing and applying an appropriate system of protection for the fourteenth-century glass mosaic on St. Vitus Cathedral in Prague, in collaboration with the Office of the President of the Czech Republic.

1992–98

HOMINID TRACKWAY AT LAETOLI

A collaboration with the government of Tanzania, through conservation and site maintenance, to protect the hominid footprints at Laetoli, at 3.6 million years old the most ancient traces yet found of humanity's ancestors.

1992–97

ROYAL BAS-RELIEFS OF ABOMEY

With the government of Benin, preserving a unique record of the reign of Dahomey's King Glélé by conserving the oldest bas-reliefs from the Royal Palaces of Abomey, a World Heritage Site.

1994–96

ROCK ART OF BAJA CALIFORNIA

A collaboration with the Instituto Nacional de Antropología e Historia in Mexico to investigate the condition of cave paintings in the Sierra de San Francisco in Baja California and to recommend policies for their conservation.

1997–present

CHINA PRINCIPLES

Developed and promoted national guidelines for the conservation and management of cultural heritage sites in China, *Principles for the Conservation of Heritage Sites in China*, in partnership with China's State Administration for Cultural Heritage, the Dunhuang Academy, and the Chengde Cultural Heritage Bureau.

1997–2002

COLLECTIONS IN HOT & HUMID ENVIRONMENTS

Developed economical and sustainable climate control strategies for significantly reducing biodeterioration by improving collection environments in historic buildings in hot and humid regions.

1997–present

WALL PAINTINGS CONSERVATION AT MOGAO GROTTOS

Working with the Dunhuang Academy, designed, implemented, and disseminated a methodology for the conservation of wall paintings in Cave 85 of the Mogao Grottoes—following the China Principles, as presented in *Principles for the Conservation of Heritage Sites in China*—that is adaptable to other cave temples at Mogao and to other Silk Road sites.

1998–2003

GELS CLEANING RESEARCH

Collaborative scientific research addressing important questions and concerns regarding the use of solvent-based gels as cleaning systems for painted surfaces.



Herant Khanjian, GCI assistant scientist, removing a paint sample for analysis in 2005 as part of the Modern Paints project. Two years later, the project became part of a larger and long-term GCI research initiative that is looking more broadly at the many and varied conservation needs of modern and contemporary art. Photo: Dennis Keeley, for the GCI.

important role for the GCI in the dissemination of information to the field. This remains central to the GCI's mission, but with an expansion in volume and modes of delivery that could not have been foreseen thirty years ago.

LOOKING FORWARD

If anything, the context for our work has become even more challenging. The conservation field has expanded in scope and in the variety of professionals engaged in it. Government resources for cultural heritage continue to decline, and there is serious competition for private sources of funding. Conflict and political instability threaten heritage in many parts of the world, as do rapid population growth and urbanization. Climate change has led to heightened risk from natural disasters and the need to develop more energy-efficient approaches to conservation and management. The rapid development of digital technologies has created both new opportunities and new challenges. And, of course, the heritage of the recent past is coming of age and is at increased risk.

Clearly, no single organization can deal with all of the issues faced by the conservation field. In the years ahead, the GCI will continue to develop areas of work in which it has a long history while attempting to address emerging needs. For example, in recent years we have expanded our role in the conservation of modern and contemporary art and architecture, and we envision that this will be an important area of work going forward. We also aim to better integrate our work in the realm of archaeological heritage to address more effectively tourism and visitor management issues, and we have begun to invest more strategically in the area of historic cities.

1998–2009

LIME MORTARS & PLASTERS

Collaborative scientific research to enhance knowledge of the fundamental properties and performance of high-calcium lime mortars and plasters.

1998–2005

RESEARCH ON THE VALUES OF HERITAGE

Developed tools and methods for use by conservators and allied professionals for assessing values and for applying the results of such assessments to sustainable conservation and management solutions.

1998–2005

TERRA

A partnership with the International Centre for Earth Construction—School of Architecture of Grenoble and ICCROM with activities that focused on the study and conservation of earthen architecture in the areas of education, research, planning and implementation, and advocacy.

1999–2009

MAYA INITIATIVE

An initiative to develop and reinforce conservation practices through collaborative efforts toward resolving common problems in the Maya region; working with local authorities, projects included development of a management plan for Joya de Cerén in El Salvador and a conservation strategy for the Hieroglyphic Stairway at Copán in Honduras.

2000–present

LOS ANGELES HISTORIC RESOURCE SURVEY PROJECT

Researched the objectives, methods, funding, and incentives necessary for a comprehensive citywide survey in Los Angeles and worked with city decision makers and stakeholders to implement a survey program; worked with the city to develop and launch HistoricPlacesLA: Los Angeles Historic Resources Inventory, an online information and management system to inventory, map, and describe historic places in Los Angeles.

2003–10

ALTERNATIVE CLIMATE CONTROLS FOR HISTORIC BUILDINGS

Applying the findings of the Collections in Hot & Humid Environments project, investigated controlled ventilation, heating, and dehumidification as viable climate control strategies for improving collection environments in historic buildings in hot and humid regions.

2003–present

MUSEUM LIGHTING RESEARCH

Scientific research seeking to reduce the damage to works of art on paper caused by museum lighting, through the reevaluation of current illumination guidelines and the testing and design of new lighting.

Preventive conservation will remain an important component of GCI work and will be broadened to develop more sustainable climate control strategies for museums and to carry out targeted research to better assess risk to collections. The Institute will continue to invest in digital technologies for conservation, including improvements to the Arches system for heritage inventory and the creation of a framework for the better integration of scientific data generated in the study of particular objects and sites. And, of course, publication and the dissemination of information will remain central to the GCI's mission.

Yet there are broader challenges that must be addressed by the conservation community at large if the field is to retain its relevance and impact in the years ahead.

Education

The number of academic programs offering specialized training in conservation has increased substantially in the last thirty years. However, these tend to be concentrated in certain parts of the world, with other regions having little or no access to conservation education. And while there is general agreement on the knowledge and skills needed to create entry-level conservators, there is much less agreement on what constitutes a conservation architect, conservation scientist, or site manager. Moreover, as the field has become broader and more complex, it has become increasingly important not just to provide conservators with a sound theoretical basis for their practice and strong scientific and technical skills, but also to provide the ability to think critically, to communicate with a variety of audiences, to deal with conflict and arrive at negotiated solutions,

and to work effectively as members of interdisciplinary teams. To improve the quality of conservation education generally and to ensure that conservation professionals are equipped to face current challenges, the academic and professional communities may have to rethink both what is taught and how conservation education is delivered. It will also be necessary to better define various professional profiles and the training required to achieve recognized competence.

Conservation Science

Conservation science is now recognized as a discrete area of enquiry. The last thirty years have seen an increase in the number of institutions involved in heritage science and a growing body of scientific literature. However, as with education, recent studies of conservation science indicate that the vast majority of activity occurs in particular parts of the world (largely North America and Europe, with growing constituencies in Latin America and Asia).² Also, there is no clearly defined profile or educational route for the conservation scientist. Similarly, though various national and international funding programs for cultural heritage science have appeared in recent years, available financial support for the sector is again diminishing. As has been pointed out before, conservation research will never be competitive unless it can demonstrate both a consistent level of quality and the importance of conservation-related issues to larger scientific and societal concerns.³ To do this, the profession needs to work together to develop cogent national and international research strategies that will be compelling and will justify support at the highest levels. This demands stringent evaluation of

2005–09

ARCHITECTURAL RECORDS, INVENTORIES, AND INFORMATION SYSTEMS FOR CONSERVATION (ARIS)

An advanced international course in architectural conservation, heritage recording, and information management, offered three times in partnership with ICCROM.

2005–present

SOUTHERN AFRICAN ROCK ART PROJECT

A collaborative project to strengthen rock art preservation, conservation, accessibility, and management in the Southern African region through education and training activities.

2005–present

UCLA/GETTY MASTER'S PROGRAM ON THE CONSERVATION OF ETHNOGRAPHIC AND ARCHAEOLOGICAL MATERIALS

The only graduate academic conservation program on the West Coast of the United States and the only US program to focus on archaeological and ethnographic materials; developed through the efforts of the GCI, the program is a partnership of the Cotsen Institute of Archaeology at UCLA and the Getty Trust.

2006–present

EARTHEN ARCHITECTURE INITIATIVE

An initiative to further the conservation of earthen architecture through training, research, planning and implementation, and advocacy; projects include the Conservation and Rehabilitation Plan for the Kasbah of Taourirt and the Seismic Retrofitting Project.

2007–present

MODERN AND CONTEMPORARY ART RESEARCH INITIATIVE

A major science initiative investigating the many and varied conservation needs of modern and contemporary art; projects include research into modern paints, plastics, and outdoor sculpture.

2008–present

MOSAIKON

Addresses the need for enhancing capacity in the conservation and management of archaeological mosaics in the Mediterranean region through training, research, network building, and dissemination and exchange of information; a partnership of the GCI, the Getty Foundation, ICCROM, and the International Committee for the Conservation of Mosaics.

work against defined indicators to prove the value and relevance of conservation science in the policy arena.

Access to Information

Despite the rapid development of digital platforms for communication, there are still many parts of the world where access to information is severely limited. As a profession, it is important that we work harder to get information regarding the conservation of cultural heritage to those who need it most. This involves more creative use of digital media, more open access to relevant professional journals, the production of publications in both digital and print form, the translation of critical texts into a variety of languages, and the strengthening of professional networks. There are undoubtedly economic challenges in the publishing industry that need to be addressed to facilitate easier access to information, but these are not unique to the conservation sector, and sustainable models have begun to emerge.

Perception and Visibility of the Field

The conservation profession has not been very effective at making a case on the political level for its importance and legitimacy. Though heritage conservation is undoubtedly one of the most important intellectual movements of the last century and profoundly contributes to the public realm, it is threatened by a lack of policy attention and a low public profile.⁴ If the field is to thrive, it must better articulate its value to society at large and find more effective ways of communicating with a variety of audiences.

In the words of David Lowenthal, “Posterity is conservation’s *prime* concern. Being answerable to it is our main duty.”⁵ As the GCI enters the next phase in its history, we remain convinced that the conservation of cultural heritage contributes not just to our understanding of the past but also to the quality and diversity of the world that will be passed on to future generations. In preserving objects of beauty and memory that represent our shared humanity, we strive to promote a more civil society. It is in this spirit that the GCI looks to the future.

Jeanne Marie Teutonico is associate director for programs at the Getty Conservation Institute.

1. *The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance* (Burwood, Australia: Australia ICOMOS Incorporated, 2013).
2. Alison Heritage, Cecilia Anuzet, Erika Andersson, and Catherine Antomarchi, “The ICCROM Forum on Conservation Science 2013: A Collaborative Partnership for Strategic Thinking,” in *ICOM-CC Seventeenth Triennial Conference Preprints, Melbourne, 15–19 September 2014*, edited by J. Bridgland (Paris: International Council of Museums, 2014).
3. For example, see Jeanne Marie Teutonico and John Fidler, “Time for Change: An Overview of Building-Materials Research for Conservation of Historic Structures,” *APT Bulletin* 29, nos. 3–4 (1998): 45–49.
4. Samuel Jones, “It’s a Material World,” *Studies in Conservation* 55, no. 4 (2010): 242–49.
5. David Lowenthal, “Omens from the Mediterranean: Conservation Nostrums in Mare Nostrum,” *Studies in Conservation* 55, no. 4 (2010): 231–41.

2008–present

PRESERVATION OF PHOTOGRAPHS AND PHOTOGRAPH COLLECTIONS

A collaborative training project to advance the field of photograph conservation by building the capacity of professionals who care for and manage collections; the project includes the Middle East Photograph Preservation Initiative and workshops in central, southern, and eastern Europe.

2009–present

CONSERVATION AND MANAGEMENT OF THE TOMB OF TUTANKHAMEN

A multiyear project on the conservation and management of the tomb of Tutankhamen, in partnership with Egypt’s Ministry of State for Antiquities.

2011–present

ARCHES PROJECT

A collaboration of the GCI and World Monuments Fund that developed an open source, web- and geospatially based information system purpose-built to inventory and manage immovable cultural heritage; current developments include formation of an open source community to further the software’s development and its adaptation by a number of cultural heritage organizations.

completed October 2012

CONSERVATION OF AMÉRICA TROPICAL

A collaborative project with the City of Los Angeles to complete conservation of the David Alfaro Siqueiros mural *América Tropical* and to construct a shelter, viewing platform, and interpretive center placing the mural in its historical and artistic context.

2012–present

CONSERVING MODERN ARCHITECTURE INITIATIVE

A comprehensive program to advance conservation of modern architecture through research and investigation, the development of practical conservation solutions, and the creation and distribution of information through training programs and publications; projects include the Eames House Conservation Project and the Salk Institute Conservation Project.

2012–present

MANAGING COLLECTION ENVIRONMENTS INITIATIVE

A multiyear initiative addressing compelling research questions and practical issues pertaining to the control and management of collection environments in museums, libraries, archives, and other repositories; projects include Museum Lighting Research.

THREE DECADES OF GCI SCIENCE



BY JAMES DRUZIK

WELL-ORGANIZED CONSERVATION RESEARCH FACILITIES, large and small, were created throughout the twentieth century in Europe and North America: the Museum of Fine Arts, Boston (1930), the British Museum (1931), the National Gallery, London (1934), and the Institut Royal du Patrimoine Artistique, Brussels (1948), to name a few. But professional conservation as we understand it today really took flight in the early 1950s with the creation of an international professional association, the IIC (International Institute for the Conservation of Historic and Artistic Works), a journal, *Studies in Conservation*, and the first regional center in the United States, the Oberlin Intermuseum Conservation Association. Other laboratories quickly followed: the Freer Collection (1952), Rome's International Centre for the Study of the Preservation and Restoration of Cultural Property (1959), the Centre de Recherches sur la Conservation des Documents Graphiques, Paris (1963), the Conservation Analytical Laboratory of the Smithsonian Institution (1965), and the Canadian Conservation Institute (1972). The Getty Conservation Institute (GCI) was created against this backdrop.

Harold Williams (first president and chief executive officer of the J. Paul Getty Trust) and Nancy Englander (the Trust's director of Program Planning and Analysis) formulated their ideas for GCI Science after visiting many of these conservation facilities. They concluded that scientific research tended to concentrate on specific collections and that there were few places to go to investigate new problems. Williams hired Frank Preusser from the Doerner Institute in Munich to create the research facility in 1983.

How do you build a science department for an institute that hasn't been created yet? A difficult question—and precisely the directive the first science chief of the GCI was given in the early 1980s. What should be the emphasis of the work?

To him, the following analysis seemed obvious. First, build for the future by hiring mostly young scientists and giving them experienced mentors to supervise their work. Second, establish a credible early track record by contracting research to established laboratories with histories of productivity and publication. Third, recognizing that a conservation laboratory couldn't compete with any one industry in developing new materials yet would potentially dip into many, use industry as a resource for existing materials that could be applied to conservation problems for the first time.

HOW CONSERVATION RESEARCH EVOLVED

Journal articles often reflect what's considered cutting-edge knowledge in conservation labs at the time and offer snapshots of hot topics by decade. *Technical Studies in the Field of Fine Arts* (Fogg Museum, Harvard University), the *Journal of the American Institute for Conservation*, and *Studies in Conservation* were initially dominated by contributions on artists' techniques and materials, treatment case histories, and other single object studies (this was found to be true as recently as the 1990s).¹ Newly developed specialized tools were discussed but with much lower frequency. Occasional papers on color science, air pollution fundamentals, infrared reflectography, and the use of advanced tools like gas chromatography and mass spectrometry for binder analysis were evident but numbered just

a handful during the first few decades of *Studies in Conservation*.

By the 1970s a subtle change was evident. Artists' techniques and materials remained the most popular topics, but new tools were expanding the possibilities of what we could learn from increasingly smaller samples. In addition to polarized optical microscopy, papers were published on infrared spectroscopy, X-ray diffraction, scanning electron microscopy, and X-ray fluorescence. In 1966 gas chromatography was introduced for the analysis of dried oil films, and within ten years major holdings in museum collections were being compared using these once-rare techniques.

In the early 1980s conservation science began examining the distribution of, and building physics for, what we would soon call agents of deterioration. The infiltration of air pollution into the museum environment and its effects on a host of materials was a favored theme. Like others, we were discovering that indoor-generated air pollution was often a greater risk to materials than outdoor varieties. Simultaneously, science began exploiting advanced industrial materials like Parylene and employing unique technologies such as digital image processing to reinterpret X-radiography and other forms of technical photography. Scientific research began to show clear signs of self-awareness with published reports on the scientific needs of the field and road maps on how to meet them. A 1979 report recommended a National Institute for Conservation (NIC). The GCI, with its structural flexibility and ability to leverage in-house facilities with contracted research, was perfectly poised to exploit these new horizons.

ENTER THE GCI

In November 1984 a new report, "Proposed Priorities for Scientific Research in Support of Museum Conservation," was released by the National Institute for Conservation Scientific Research Priorities Committee. Notwithstanding the fact that a "United States National Institute" didn't actually exist in any physical form, the committee proposed ten ambitious areas it thought needed investigation: influence of atmospheric pollutants on collections; biological sources of deterioration; development of conservation materials and treatments; characterization, deterioration, and stabilization of organic materials; environmental control and monitoring; deterioration introduced by treatments and environmental conditions; standard test procedures; health hazards; mechanisms of deterioration and preservation of excavated artifacts; and the preservation of modern materials. Excepting two areas, biological sources and health hazards, GCI Science was about to tackle the whole list. Knowing it couldn't acquire this broad range of expertise in an internal research program, the Trust gave Preusser a substantial budget to fund sponsored research at other conservation institutions and universities. These were not grants to external researchers, but rather "works for hire" where the GCI provided funding and played a major role in designing the research.

Not all of these priorities were pursued immediately. Before 1985 the GCI was only a science department of four people inhabiting the main living room of the Ranch House—J. Paul Getty's

original residence in Malibu (site of the current Getty Villa). In 1985 the GCI moved to a new facility in Marina del Rey and underwent an inflationary "big bang" of its own where its staff and facilities expanded twentyfold. The science program comprised four sections: analytical chemistry, materials properties, conservation processes, and extramural research.

Of the first three extramural projects, one went to Glen Cass at the California Institute of Technology to study the museum distribution and damage potential of outdoor air pollution in Southern California. The other two, on accelerated thermal and photochemical aging and on cellulose ethers, were both awarded to Robert L. Feller of the Mellon Institute. Feller was also on the NIC committee setting national research priorities. It is now clear that the national zeitgeist was suddenly and permanently impacting Williams's Getty vision.

SHARING INFORMATION AND EXPERIENCES

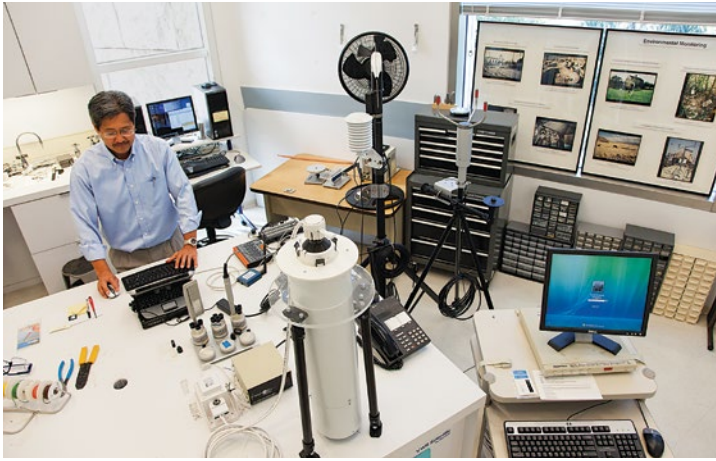
Three hallmarks of the GCI—particularly its science program—have been its generosity in making informational resources available to graduate interns and postdoctoral fellows, providing midcareer training opportunities, and offering a quiet haven for scholars to complete important projects. Progress on scholars' projects is often accelerated by access to GCI staff expertise and facilities.

Sharing information resources began with our contribution of materials properties research to the Canadian MCIN (Materials Conservation Information Network) database and the assumption of responsibility for AATA (Art and Archaeology Technical Abstracts) in 1985. Today the numerous books available as downloadable PDFs from our website are our most heavily trafficked pages, second only to the home page.

Two individuals who set the standard for other visiting scientists were Neville Agnew (the Queensland Museum) and Nieves Valentin (a 1987–89 research fellow). Agnew came to GCI to study adobe preservation for three months in 1986 and later returned as a staff member. Valentin continued a project conceptualized by Preusser that used a low-oxygen atmosphere for the preservation of cultural properties placed in hermetic display cases. The main goal was minimizing alterations in the chemical composition of



GCI research lab associate Carole Namowicz uses a micro-XRF spectrometer to examine the Getty Museum's *Chiarito Tabernacle* by Pacino di Bonaguida. Photo: Karen Trentelman, GCI.



Senior Scientist Shin Maekawa tests instrumentations for an environmental monitoring system to be installed in a historic house museum. Photo: Scott S. Warren, for the GCI.

historic materials. Within that project, an additional investigation was proposed to estimate the impact of an inert atmosphere (nitrogen) on biological agents, including microorganisms and insects commonly found in anthropological remains. This deinfestation system requiring different equipment and tools—designed, tested, and disseminated by the GCI’s Shin Maekawa—has been used widely in the last quarter century and is currently part of preventive conservation strategies in Spain and some Latin American cultural heritage institutions.

The number of visiting scientists and other scholars at GCI Science over the last thirty years is considerable. In the last ten years alone there have been approximately sixty-five science “visitors,” from nearly as many institutions, who spent from two weeks to more than a year enriching their research experiences. The graduate interns in science, selected for a year, have numbered around forty since 2000—about half the number the entire Institute supported during the same period (the Getty as a whole has hosted over 650 interns).

Dissemination sometimes took unexpected turns. For instance, GCI Science funded a symposium for the Materials Research Society, “Materials Issues in Art and Archaeology,” every two years for a decade, on the premise that conservation research would profit by exposure to materials science not only through GCI conference participation but more so with the GCI as an active “mover and shaker.”

INTEGRATION AND EXPANSION

By the mid-twentieth century, conservation research had settled into a focused discipline, examining unique deterioration conditions like waterlogged wood or finding a heretofore unknown pigment or corrosion product. The tools were simple and methods time-consuming. Scientists used pencils and paper or, later, simple calculators—not the gigahertz-wielding computers anyone can use now. Acquiring technical skills was massively labor-intensive and isolating, so once you mastered a technique, you kept right on using it. Studying more than a single object was a trade-off among time, availability, and the effort to learn a new technique. As imaging tools and analytical instruments became common and easier to operate, a major portion of a collection could be surveyed, and sample preparation could be automated.

In the late 1980s GCI research was a mixture of external and internal research, but a further subdivision also existed. One labora-

tory, originally headed by David Scott, followed the paradigm of the rest of the conservation field, carrying out studies on single or small sets of objects of the Getty Museum. The remainder of the science staff was not bound to any particular collection. The focus for this latter group could be the Lintels of the Church of the Holy Sepulchre, the Dead Sea Scrolls, environmental controls in tropical climates, or the effect of building structure and ventilation on energy conservation or air pollution. But slowly both subdivisions began influencing each other. Those without a collection to study found themselves intrigued by the Museum’s collections, and those previously focused only on the Museum’s objects began to roam more widely. There was a concomitant switch from sponsored external research to collaborative partnerships. After 2000 these trends accelerated, and the entire GCI Science department began acting more collectively.

TOWARD THE FUTURE

Once, a National Science Foundation (NSF) grant seemed an improbable dream, not only to the GCI but to the entire profession. Attitudes changed, and in 2010 the NSF created SCIART—Chemistry and Materials Research at the Interface between Science and Art. By 2015 the GCI has been the recipient of, or coinvestigator in, five NSF grants, starting with the purchase of Raman spectroscopy, the use of an Artax micro-XRF for elemental mapping, and the development of a new air pollution sensing system based on the model of the function of the human nose.²

The 1984 GCI model of independently contracted and in-house research has evolved to match a twenty-first-century style of research. Where once in-house staff, single objects, limited techniques, and individual collections characterized work, we now favor projects with many collaborators, the widest possible selection of techniques and methodologies, artifacts from varied institutions and locations, and shared staffing with unique expertise and skill sets.

Although most GCI science utilizes these qualities, four current GCI projects exemplify this approach. Modern and Contemporary Art Research, Researching Florentine Workshop Practice, Managing Collection Environments, and the collaboration with the Disney Animation Research Library all examine large collections of materials on multiple levels, use diverse expertise and scientific techniques, and combine their chemistry and physics to resolve complex or seemingly insoluble problems.

Conservation research has moved from the solitary activity of a few scientists using simple tools to a worldwide enterprise with a vast array of tools and volumes of automated data routinely deposited to the cloud. The GCI and its many colleagues are poised to shoulder this responsibility for the future.

James Druzik is a GCI senior scientist.

1. Alison Heritage, Cecilia Anuzet, Erika Andersson, and Catherine Antomarchi, “The ICCROM Forum on Conservation Science 2013: A Collaborative Partnership for Strategic Thinking,” in *ICOM-CC Seventeenth Triennial Conference Preprints, Melbourne, 15–19 September 2014*, edited by J. Bridgland (Paris: International Council of Museums, 2014).
2. Principal Investigator: University of Illinois, Urbana–Champaign.

CONSERVATION AND MANAGEMENT OF ARCHAEOLOGICAL SITES

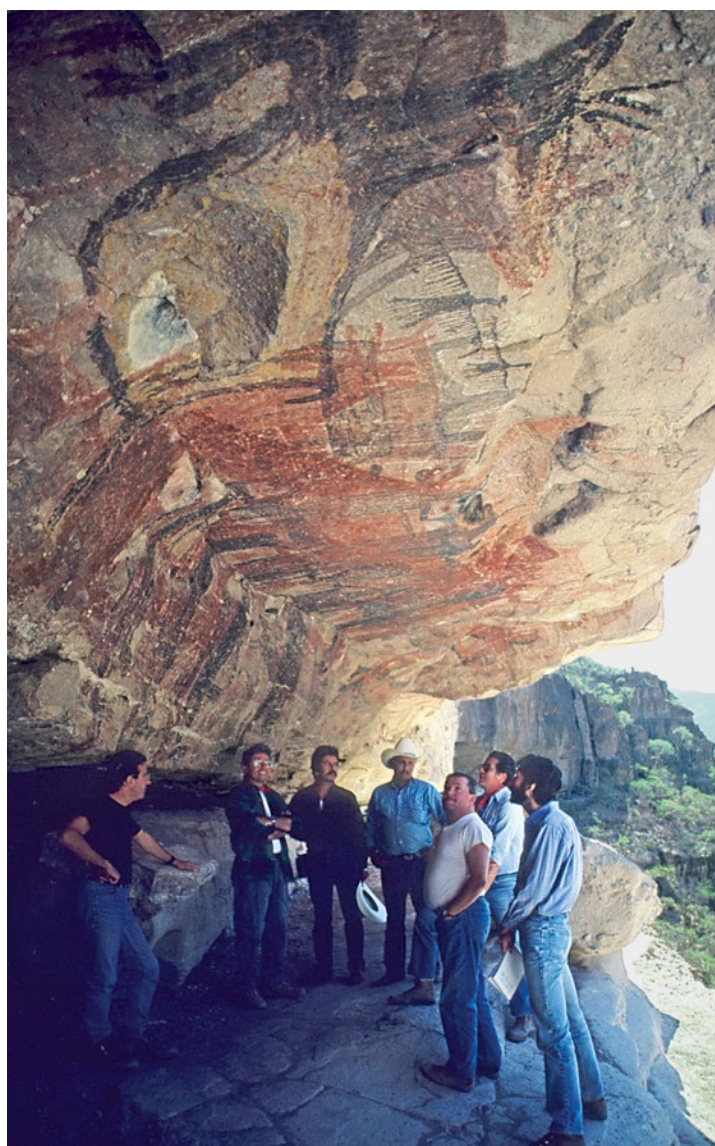
BY MARTHA DEMAS AND THOMAS ROBY

CONSERVATION OF ARCHAEOLOGICAL SITES HAS BEEN CENTRAL to the mission of the Getty Conservation Institute since its founding. The reasons are worth recalling: archaeological sites are repositories of information and knowledge about how humankind has lived, suffered, worshipped, created, destroyed, survived, and died. They are humanity's collective memory, comprising physical evidence of our journey on the planet, from the bones and tools of our earliest ancestors millions of years ago to the ruins and artifacts of more recent history. But they are fragile remnants of past lives, subject to decay and destruction, often barely surviving into our modern era of wholesale destruction. In the competition for space and resources, archaeological heritage is frequently the loser.

The Institute's first forays into conservation field projects—the Nineteenth Dynasty Tomb of Nefertari at Luxor (initiated in 1986 with the Egyptian Antiquities Organization, now the Ministry of State for Antiquities) and the Roman Orpheus Mosaic in Paphos (began in 1988 with the Cyprus Department of Antiquities)—were at significant archaeological sites. Although in different countries and from very different time periods, these projects had much in common and exemplified the GCI's early philosophy and approach to conservation. Both focused on decorative architectural surfaces (wall paintings and mosaics, respectively) privileging artistic values; neither looked much beyond the specific “object of beauty” being conserved. In the thirty years since then, major developments have occurred in the understanding and practice of conservation, both within the GCI and in the field generally. This changing nature of conservation may be characterized as movement toward a more holistic, methodological, and values-based approach that recognizes the fundamental role of good site management and the involvement of stakeholders in making conservation effective and sustainable.

EDUCATION AND TRAINING

The gradual pivot to a more holistic approach that recognizes the context and complexity of conserving archaeological sites represented a conceptual shift that began in the late 1980s, influenced by developments in Australia at the time. It was manifested in the GCI's Rock Art Site Protection and Management



A rock art site in Baja California. Baja California was the location for an early GCI field project in which the planning methodology, community involvement, and conservation approaches advocated in the Institute's early rock art training courses were put into practice. Photo: Guillermo Aldana, for the GCI.

training courses, beginning in 1989, and in the yearlong professional diploma course on rock art jointly established with the University of Canberra in Australia.

These early courses, although focused on rock art, were readily adapted to other types of archaeological sites and contained the hallmarks of subsequent courses and field projects—specifically, values-based planning with its emphasis on significance assessment

and the importance of understanding the management context in making decisions for a site's future. The first adaptations were aimed at archaeological sites with mosaics in the Mediterranean region, in Paphos in 1990 and 1993, and at grotto sites in China, in conjunction with the nascent field projects begun there in 1989.

These three-to-four-week capacity-building courses directed at midcareer professionals (mainly archaeologists, architects, and conservators responsible for conserving and managing sites) have been a mainstay of GCI training, offered separately or in conjunction with field projects, but other models have also been developed. A more broadly based initiative for earthen sites was part of the Terra project (1998–2005), undertaken in collaboration with ICCROM (International Centre for the Study of the Preservation and Restoration of Cultural Property) and CRA-Terre (International Centre for Earth Construction), in which management planning was disseminated through a training course, developed at the site level (at Chan Chan, Peru) and integrated into a university curriculum.

The model has been further developed through the MOSAIKON initiative. Based on GCI experience in Tunisia, where future site directors received an initial training course in conservation and management planning (in collaboration with the Institut National du Patrimoine), this national effort expanded in 2010 to a regional activity involving young professionals from primarily Arabic-speaking countries across the southern and eastern Mediterranean. In collaboration with ICCROM, ICCM (International Committee for the Conservation of Mosaics), and the Getty Foundation, MOSAIKON courses have emphasized mentored learning over a yearlong period, recognizing that for short courses to have long-term impact, participants must apply their knowledge at their own sites. The initiative addresses not only site managers, but also conservation practitioners, in particular technicians, since effective, sustainable site conservation requires skilled personnel at all levels.

CONSERVATION AND MANAGEMENT FIELD PROJECTS

The GCI has worked to put theory and methodology into practice to provide models for comprehensive planning for conservation and management of archaeological sites. The more ambitious field projects have pursued the holistic approach to archaeological site conservation that first emerged in GCI training courses, and most have incorporated elements of training or have had a didactic purpose.

In China, where we have sustained our longest collaboration, conservation and management activities have been implemented at various levels. Most influential has been working with partners at the national level (the State Administration of Cultural Heritage and China ICOMOS) to develop the *Principles for the Conservation of Heritage Sites in China*, disseminated in 2000. These were applied at the site level to comprehensive master planning at the Mogao Grottoes and through an emphasis on methodology, analysis, and testing in the Cave 85 project, which aimed to conserve

and present one of the most important painted grottoes at the site, while serving as a model for similar sites in the region.

Following closely upon training initiatives, the GCI's first rock art field project—conducted with the Instituto Nacional de Antropología e Historia in the Sierra de San Francisco in Baja California, Mexico, in the 1990s—made development of a management plan a central aim. More recently, site management workshops have taken place in southern Africa and Australia as part of the GCI's Southern African Rock Art Project, where community involvement and indigenous management have been emphasized.

The development of a management plan with the Consejo Nacional para la Cultura y el Arte (Concultura) for the archaeological site of Joya de Cerén in El Salvador (1999–2002) took the values-driven and participatory site management process much further in the direction of stakeholder participation to address complex social conditions related to the site's conservation. The comprehensive conservation and management planning undertaken for the Valley of the Queens in Egypt exemplifies how the GCI's approach has broadened to encompass the whole valley in which the Tomb of Nefertari resides, with equal emphasis on conservation and management.

As an early adopter and adapter of values-based planning, the GCI brought its own perspective to this process, enhancing the role of condition assessment and understanding deterioration processes in decision making. This stems from our conviction that fundamental values reside in the materiality and authenticity of archaeological sites. This approach has informed both training and field projects. The emphasis on condition as an important criterion in decision making is currently exemplified in the MOSAIKON field project at the site of Bulla Regia in Tunisia. Here, planning is based on a survey of almost four hundred mosaics that assessed their condition, significance, and degree of exposure, while weighting condition over the other two. The resulting conservation priority rating for each mosaic facilitates the decision-making process and the development of a program of prioritized conservation actions, including preventive measures such as reburial and sheltering.

The GCI's impact on the practice of reburial has been especially significant and multifaceted. Reburial is a crucial management tool to slow deterioration and reduce the need for remedial treatments and maintenance. Since the 1990s, reburial as a technical intervention and site management tool has been disseminated through GCI training courses and publications and in field projects incorporating extensive investigation, testing, and implementation undertaken at the Hominid Trackway at Laetoli, Tanzania, at Chaco Canyon and Fort Selden in New Mexico, and at mosaic sites in Tunisia and Israel.

RESEARCH, DISSEMINATION, AND PUBLICATION

Complementing professional courses and field projects have been numerous research initiatives (both theoretical and practical),



The Mogao Grottoes in China, where the GCI, in partnership with the Dunhuang Academy, has developed and applied a master planning process, conservation methodologies, and visitor management strategies and has convened international workshops and conferences related to conservation and management of sites. Photo: Wu Jian, the Dunhuang Academy.

conferences, workshops, and symposia. Given the importance of values-based planning for both training and field projects, the need for research to explore values further was seen as critical, especially as new values of heritage sites were emerging as important to society. To this end the GCI initiated the Agora project, a major research initiative in the late 1990s to explore the many values and benefits of cultural heritage conservation, including new ways of looking at economic value. This was seminal research for the profession and was important for instilling a deeper understanding of values-based planning in our practice.

Over three decades, the GCI has convened many international conferences and workshops to bring professionals from

different disciplines together, discuss problems, and disseminate new ideas. Some have targeted resource types, such as the international mosaic conservation conferences the GCI has organized or supported, and the Silk Road conferences in China that focused on grotto sites; others were aimed at specific conservation interventions, such as the colloquia on shelters and reburial, published in special issues of the journal *Conservation and Management of Archaeological Sites*, an important resource for the field begun in 1995. Convening events have also sought greater convergence of the objectives and motivations of conservation and archaeology. Such were the aims of the ambitious 1995 Mediterranean conference with venues in four countries,



The Roman site of Paphos in Cyprus, location in 2014 of the start of a course on management of archaeological sites with in situ mosaics, part of the MOSAIKON initiative. The Paphos site has been a venue for both mosaic conservation field projects and archaeological site conservation and management training courses since the beginning of the GCI. Photo: Scott S. Warren, for the GCI.

the Corinth workshop in 2000, and the conservation theme organized at the Fifth World Archaeological Congress in 2003. The publications emerging from these and other conferences, as well as research, bibliographies, and literature reviews on conservation and management of archaeological sites, are one of the Institute's most important legacies to the field.

EVALUATING THE PAST, LOOKING TO THE FUTURE

Adapting approaches to conservation and management created in Western economies to different contexts is not straightforward and can be fraught with difficulties. In looking for ways to better direct our efforts in non-Western environments, we periodically evaluate our projects. Several years ago an internal GCI review of management planning activities confirmed the validity of values-based decision making based on knowledge and practice. It also brought forth the greater viability of the process in English-speaking participatory democracies, where the language

and the methodology of site management planning were developed. Nevertheless, it has also been our experience that iteration and practice enhance acceptance.

Site management requires not just a plan, but also the resources and institutional infrastructure to implement it. Insufficient resources and dysfunctional institutions around the world pose severe challenges to making progress in how archaeological sites are managed for their future preservation. Good governance, legislative frameworks, and policies for heritage conservation are key elements for successful plan implementation, but in many places the lack, inadequacy, or inefficacy of legal instruments and cultural policies has hindered the application of systematic approaches and the implementation of plans. These circumstances take significant time to change and entail sustained presence at sites for effective results.

As the understanding of cultural heritage broadens and deepens, so do the challenges of preserving it materially and in a way that is meaningful and beneficial for society. Civil wars, looting, lack of stability, development driven by urbanization and tourism, climate change, and the impact of large numbers of visitors on heritage sites have emerged in recent decades as global threats. Addressing these urgent problems is the new frontier of managing archaeological sites worldwide in the twenty-first century.

There is a continuing need to train individuals responsible for archaeological sites and to provide site managers with tools to protect their archaeological heritage. This was the impetus for the development, through the Arches Project (a GCI collaboration with World Monuments Fund), of an open source, web- and geospatially based information system to inventory and manage sites, initially developed in 2004 to assist postwar Iraq. The GCI has also begun focusing on the tourism challenge through a comprehensive visitor management program and several international workshops undertaken with partners at the Mogao Grottoes in China, as well as in its planning for the Valley of the Queens project.

Over the last thirty years, both the threats to archaeological heritage and the values that society confers on this heritage have evolved significantly, requiring different models and modalities. The GCI's ability to address the changing nature of the field through an integrated aggregate of activities—research, training, field testing and model field projects, developing methodologies and policies, convening workshops and conferences, and publishing widely—may be its greatest strength.

Martha Demas and Thomas Roby are GCI senior project specialists.

PREVENTIVE CONSERVATION

Sustainable Stewardship of Collections

BY KATHLEEN DARDES AND SARAH STANIFORTH

PREVENTIVE CONSERVATION—THE POLICIES AND PRACTICES taken to assure the protection of cultural heritage from environmentally induced damage—has been a major focus of Getty Conservation Institute work since the GCI opened. Managing risks to cultural materials through actions designed to prevent or at least mitigate the potential for damage is reflected in the full range of the Institute’s work, from built heritage to museum collections. While preventive conservation principles are embodied in all GCI activities, a vital area of Institute research, education, and dissemination programs over the past three decades has been the preventive conservation of collections.

ESTABLISHING PREVENTIVE CONSERVATION RESEARCH AND TRAINING

As noted elsewhere in this newsletter (see p. 12), the research agenda established during the GCI’s early years reflected the intention to focus technical research on problems critically important to the conservation field. Then, as now, research on museum climatology was relevant and timely. Awareness of preventive conservation as a distinct area of conservation research and practice increased across the international conservation field in the second half of the twentieth century, resulting in a growing body of technical literature on mechanical, chemical, and biological causes of deterioration and on measures to mitigate them. Although progress had been made in many areas of preventive conservation, thanks in large part to a number of international research entities, the field was still at a relatively early phase of understanding and defining “the museum environment.”

The first ten years of GCI research in preventive conservation were a concerted effort both to complement work taking place elsewhere and to fill knowledge gaps in the field. The Institute’s far-ranging research included investigations of atmospheric pollutants, mechanical systems and energy conservation, the moisture-buffering capacity of museum storage cases, pest control through anoxia, and seismic mitigation measures for art objects.

An examination of the practical aspects of preventive conservation shows the complexity of the concept of the museum environment, an ecosystem comprising both physical and organizational layers. While research is clearly essential for a better understanding of collection materials and their preservation, preventive conservation is fundamentally an applied pursuit, using scientific knowledge as a basis for policies and practices that contribute to safe collection environments. For this reason, the GCI’s interest in preventive conservation has always extended well beyond the lab and into the operations of the museum itself. Dealing effectively



GCI Assistant Scientist Vincent Beltran testing exhibition monitors in Institute labs at the Getty Center. Photo: Scott S. Warren, for the GCI.

with a collection’s physical environment requires knowledge of the larger macroclimate of a museum, the type of building it occupies, the systems within the building, and the microclimates of galleries, storerooms, and showcases. This physical environment in turn is impacted by the organizational environment—the mission, policies, and operations of the institution itself as well as the audiences it serves. Within this complex and dynamic framework, the museum environment is clearly more than a series of technical problems that can be addressed by scientific expertise alone. Instead, collection environments require an expanded view of the role and influence of conservators within the entire museum ecosystem.

This concept was a basis of the Institute’s first training program in preventive conservation. While GCI research was tackling problems associated with the physical aspects of the museum environment, the Institute’s Training Program (a precursor to today’s Collections Department) was engaged in projects promoting the larger concept of preventive conservation practice and the symbiotic relationship between the physical environment and the organizational environment. Emphasizing the conservator’s role in potentially influencing institutional policy making, the GCI launched a series of training projects in the 1990s, beginning with *Preventive Conservation: Museum Collections and Their Environment*. This course was designed to encompass both technical information and the management skills essential for implementing preventive conservation within museums. One significant feature, unique for the time, was the focus on museum buildings and their systems and on the role conservators can play within museum design, building, and



The North Pavilion Sculpture and Decorative Arts Galleries at the J. Paul Getty Museum. A safe museum environment balances the needs of a disparate range of materials and object types with the requirements for visitor comfort and enjoyment. Photo: Foekje Boersma, GCI.

renovation projects to ensure that preventive conservation concerns are addressed early in the design and construction process.

The course also broke new ground in bringing together participants who worked in different climates and different types of museums and heritage sites around the world. One of the authors, Sarah Staniforth (an instructor on all but the pilot course), recalls how much she learned from participants as discussions explored the relationship between the climate inside buildings and local exterior conditions. This was one of the first courses to address head-on the issue of high energy consumption by museums in the developed world. Attitudes changed significantly during the time period when the course was offered. In the early years, some participants from major museums in North America and Europe had doubted whether museums even needed to consider energy use, arguing that the high value of the collections justified the expense of tightly controlled environments. By the end of the decade, however, there was a much greater enthusiasm for the possibility of achieving appropriate collections conditions with methods that minimized global environmental impact.

DEFINING AN APPROPRIATE ENVIRONMENT

By the early 2000s it was clear that responsible stewardship of collections could no longer be dictated by a single approach; indeed, *sustainability*—a word just coming into widespread currency—required flexible thinking and a pragmatic approach. Within the conservation field, the notion of an *ideal* environment for collections was replaced by the concept of an *appropriate* environment. In place of a universal standard (that was neither quite universal

nor a true standard), a localized approach was taking hold. With this approach, preventive conservation solutions were geared to the specifics of a given climate, museum building, collection, set of identified risks, mission, and range of operational priorities, as well as to the available resources.

Defining appropriate environments and strategies to support them became an important part of GCI environmental research. The Institute's contacts with colleagues in institutions worldwide increased, creating new opportunities to address preventive conservation challenges in new contexts. From the late 1990s until 2010, the GCI pursued an ambitious program of research focusing on development of environmental management strategies for collections in hot and humid environments. Contrary to the situation generally encountered in temperate regions—where most of the previous research on the museum environment had been undertaken—materials in subtropical and tropical regions face greater risk from biological and microbiological attack than from factors inducing mechanical or chemical damage. The great expense of installing, maintaining, and operating high-tech mechanical systems for cooling and dehumidifying has always presented a formidable challenge to collection caretakers in hot and humid regions. Over more than a decade, the Institute conducted research on the development of economical and sustainable environmental management strategies that could significantly reduce the potential for biodeterioration in these climates. Research examined alternatives to conventional air-conditioning systems by investigating the feasibility of controlling high relative humidity through a combination of dehumidification, ventilation, and air circulation.

Meanwhile in Europe, other researchers were investigating practical low-energy methods of keeping relative humidity as constant as possible. In the United Kingdom, researchers and conservators developed conservation heating as an environmental management strategy, drawing upon the experience of the World War II evacuation of the National Gallery collection to a slate quarry in North Wales. Conservation heating was found to be particularly suitable for the numerous collections housed in historic buildings where controls on existing heating systems could be changed from thermostats to humidistats. At the same time in Scandinavia, passive methods of environmental control were being developed for storage spaces and for microclimates in display areas.

These developments coincided with growing recognition in the conservation field that high-tech heating, ventilating, and air-conditioning systems, often previously and widely considered the museum standard for collections, actually could be deterrents to good environmental management when the climate control systems were not appropriate to given situations. The faith placed in highly mechanized environmental control quite often ran up against the realities of local climates, building and collection typologies, material tolerances, and resources (both human and financial) available to support such technology.

While considerable professional attention has been given to the appropriate levels of relative humidity and temperature in collection spaces, other aspects of preventive conservation are also critical to the debate on sustainable museum environments. One important concern is lighting used in exhibitions. Over the past decade, the GCI's Museum Lighting Research project has pursued an ambitious research agenda on safely illuminating exhibited works of art. Innovations in lighting, with significant cost- and energy-saving potential, continue to be tracked and investigated.

MANAGING COLLECTION ENVIRONMENTS

In the second decade of the twenty-first century, the very idea of what constitutes a suitable museum environment and of what level of resources that environment should consume is being debated and redefined by the museum profession. The international organizations representing conservators have acknowledged the need to reconsider environmental policies and practices for collections as part of the museum world's commitment to sustainable practices, including reduced consumption of energy resources in maintaining tightly controlled exhibition and storage climates.

In 2014 at the International Institute for Conservation of Historic and Artistic Works (IIC) Congress in Hong Kong and the International Council of Museums Committee for Conservation (ICOM-CC) Conference in Melbourne, the profession agreed on a set of environmental guidelines that builds on previous debates by international museum directors in the Bizot group and by national conservation organizations, including the American Institute for Conservation of Historic and Artistic Works (AIC) and the Australian Institute for the Conservation of Cultural Materials (AICCM). The joint IIC and ICOM-CC declaration on environmental guide-

lines indicates agreement on a broader range of acceptable temperature and relative humidity levels for international loan exhibitions. The declaration noted other aspects of environmental management requiring further development, specifically that "Risk management should be embedded in museum management processes." It also acknowledged, "The issue of collection and material environmental requirements is complex, and conservators/conservation scientists should actively seek to explain and unpack these complexities."

The quest for sustainable practices has also highlighted an outstanding issue that to some has never been adequately addressed: the field's limited understanding of the damage that may occur to some hygroscopic materials in collections, particularly in composite objects in environments with wide or greatly fluctuating ranges of temperature and relative humidity. Indeed, the degree of risk to which hygroscopic materials may be subjected is currently among the fervently debated issues in conservation, and it remains a barrier to a full embrace of broader environmental parameters. As the IIC and ICOM-CC declaration states, the issue of environmental requirements is complex.

Given the critical deliberations about what constitutes safe and sustainable environments for collections, the GCI is pursuing an ambitious research and education initiative called Managing Collection Environments (MCE), a collaboration of the Collections and Science departments combining research, field activities, education, and dissemination. MCE's research program has several components; one addresses the often cited need for more investigation into the hygroscopic behavior of materials under fluctuating relative humidity levels, to help understand the conditions under which irreversible damage occurs. Since one criticism of previous research on hygroscopic materials has been that tests conducted in laboratory settings cannot adequately predict the potential for damage in actual objects in museums, a goal of the initiative is augmenting lab-based microscale research with empirical studies of climate-induced damage in the field. Relying on conservation colleagues at various sites, this collection "epidemiology" study will draw upon and assess both scientific and anecdotal data on suspected environmentally caused damage over time, potentially improving understanding of conditions that promote irreversible materials damage. Complementing the initiative's lab- and field-based activities, the Collections department will also develop a range of courses, workshops, and seminars for conservation and allied professionals, including architects, engineers, collection managers, and facilities managers.

Environmentally and economically sustainable approaches to preventive conservation will remain important for collection-holding institutions for the foreseeable future. The evolution of GCI work in this area reflects an understanding of preventive conservation that is both expanding and evolving, with respect not only to our scientific understanding of how to manage damage from environmental sources but also to the opportunities presented for the sustainable stewardship of collections.

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EARTHEN ARCHITECTURE

Sustaining Heritage, Diversity, and the Environment

BY CLAUDIA CANCINO AND ERICA AVRAMI

FOR MILLENNIA HUMANS HAVE CONSTRUCTED BUILDINGS OF earth. A universal and ever-present material, earth appears in ancient archaeological sites such as the pre-Colombian city of Caral in Peru, as well as in twentieth-century complexes like New Gournia Village in Egypt, designed by Hassan Fathy. Earth has been employed in a variety of geographic contexts and climatic conditions, and construction ranges in scale from vernacular housing to large complexes, such as the almost four thousand *ksour* of southern Morocco and the Great Mosque of Djenné in Mali. It has been superbly used in decorated surfaces, such as the high reliefs of Abomey in Benin and the earthen plasters of Cliff Palace at Mesa Verde National Park in the United States.

While this legacy of earthen building constitutes a rich and vast heritage, earth remains a ubiquitous modern construction material and vital form of shelter. The United Nations estimates that nearly 24 percent of the world's population live in earthen homes. In this respect, earthen architecture represents a significant aspect of both social and environmental sustainability, and it is a critical element of self-determination in many less developed regions. Recyclable and low in energy consumption, earthen construction has a minimal carbon footprint. While earthen architecture is often undervalued or erroneously viewed as substandard, it is a bastion of cultural and technological diversity in the face of a globalizing built environment.

For this reason, over the past thirty years the Getty Conservation Institute has engaged in projects and initiatives to advance the field of earthen conservation, all of which have involved robust collaboration with institutions and professionals around the world. By working across borders and cultures, the GCI has sought to create new knowledge that capitalizes on both cutting-edge research and traditional know-how through its Getty Seismic Adobe Project (GSAP), the Terra project, the Earthen Architecture Initiative (EAI), and more. And by leveraging its resources toward collective action, the GCI has helped empower a global network dedicated to earthen architecture and its conservation.

RESEARCH

The scope of the GCI's engagement in earthen architecture has expanded significantly over the past three decades, but its initial entry to the field was through badly needed scientific research. In the 1980s, a small but important project was launched at the site of Fort Selden, under the aegis of New Mexico State Monuments



Survey work being carried out at the Kasbah of Taourirt in southern Morocco as part of the preparation of the conservation and rehabilitation plan for the site. Photo: Claudia Cancino, GCI.

and the National Park Service Southwest Regional Office, to investigate the treatment of earthen archaeological remains. In 1988 the GCI joined New Mexico State Monuments to undertake Phase II of the research at Fort Selden, investigating chemical consolidants, capping, and protective coatings for the conservation of earthen walls, thus initiating the GCI's direct engagement with earthen architecture.

Given the prevalence of earthen architecture in earthquake-prone regions of the world, GSAP was established by the GCI in 1990, in cooperation with Stanford University, to develop and test minimally invasive and easily implemented techniques to avoid the collapse of historic earthen structures during seismic events.

The necessity of improving both the scientific foundation for earthen architecture practice (in new construction and in conservation) and the level of collaboration among researchers prompted the initiation of a research survey in 1998. Under the auspices of the Terra project—an institutional collaboration of the GCI, ICCROM (International Centre for the Study of the Preservation and Restoration of Cultural Property), and CRATerre-EAG (International Centre for Earth Construction—School of Architecture of Grenoble)—the survey polled scientists and practitioners about research needs and initiatives in the field. The results served as the basis of a six-week online discussion among colleagues across the globe, which then led to an intensive one-day colloquium at the Terra 2000 conference in Torquay, United Kingdom. The meeting produced a set of research priorities that were disseminated widely to encourage individuals and institutions to undertake needed research and to promote collaboration. The priorities helped to focus future efforts of the GCI and to engage a broader community of researchers. They likewise helped lay the groundwork for important earthen architecture research around the world.

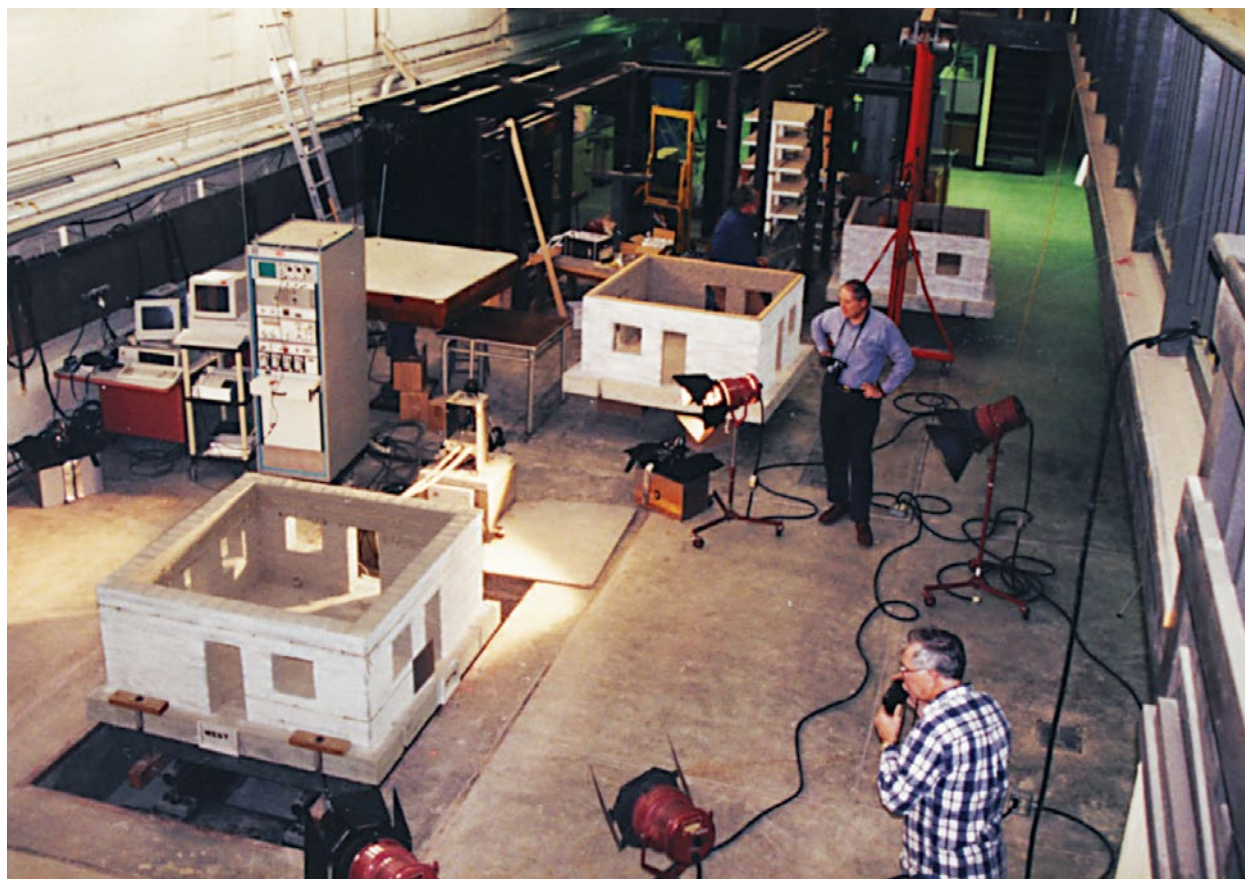
PROFESSIONAL EXCHANGE

As part of its promotion of knowledge sharing within the professional community, the GCI for the past thirty years has supported

international conferences and colloquia devoted to the preservation of earthen architecture, working to foster an open, fruitful, and significant trade of ideas in the conservation of earthen architecture. After the GCI's initial participation in the Fifth International Meeting of Experts on the Conservation of Earthen Architecture organized by ICCROM and CRATerre in Rome in 1987 (and building on its research at Fort Selden), the Institute, New Mexico State Monuments, and the National Park Service joined with ICCROM and CRATerre-EAG to organize the Sixth International Conference in Las Cruces, New Mexico, known as Adobe 90.

Adobe 90 helped develop what had been relatively small and specialized meetings of experts into truly international conferences, greatly expanding the number and geographic distribution of participants and papers and producing substantive publications that helped legitimize the work of the field. It ultimately set a new standard for conferences within the earthen architecture community and fostered institutions in other regions to take on sponsorship of the conference, which now occurs approximately every four years and receives hundreds of abstract proposals.

With the intention of organizing the first conference in Africa, the GCI partnered with the Ministry of Culture of Mali to carry out the tenth Terra conference. Four hundred fifty participants from sixty-five countries attended the 2008 conference in Bamako.



Members of the Getty Seismic Adobe Project team conducting testing at Stanford University's John A. Blume Earthquake Engineering Center in the early 1990s. Photo: Getty Conservation Institute.

To date, the eleven international conferences have strengthened collaboration, created regional networks, generated partnerships, and produced proceedings, two of which have been published by the GCI. The Institute's commitment to promoting professional exchange is also manifested in the institutional support of professional networks such as ISCEAH, Proterra, and Mediterra. The latter developed its strategic planning in collaboration with the GCI in 2009.

To address specific issues on the conservation of earthen sites, the GCI has organized several international colloquia. Under the umbrella of Terra, the GCI organized the 2001 "Protective Shelters for Archaeological Sites in the Southwest" colloquium in Tumacacori, Arizona. Three years later, the GCI (also under the Terra aegis) organized a colloquium in Mesa Verde, Colorado, to address the challenges facing the conservation of decorated surfaces on earthen architecture. In 2006, under the EAI, the GCI organized a colloquium at the Getty Center in Los Angeles to assess the impact and efficacy of GSAP. The GCI's Seismic Retrofitting Project was created in response to the colloquium's conclusions and recommendations.

EDUCATION AND CAPACITY BUILDING

While all of the GCI's endeavors in earthen architecture have sought to advance and share knowledge, education-specific initiatives have focused on developing a cadre of specialists in the field.

Through the Gaia Project (a partnership of CRATerre-EAG and ICCROM), four Preservation of Earthen Architecture (PAT) courses were organized between 1989 and 1994 in Grenoble, France, bringing together professionals from around the world for specialized training in earthen architecture conservation. In 1994 the GCI joined the Gaia Project to translate the international PAT curriculum into a regional, site-based training program. Hosted at the archaeological site of Chan Chan in Trujillo, Peru, PAT96 and PAT99 integrated site management planning into the more technically oriented curriculum, in response to the need to contextualize conservation within a broader decision-making framework for heritage stewardship. The courses utilized case studies and developed didactic materials, so that participants were well equipped to share their learning back home. With this training partnership, the Gaia Project evolved into the Terra project, which provided a platform for institutional collaboration in research, education, and professional development.

The cumulative PAT experiences helped build the network of those practicing and teaching earthen architecture conservation and led to the adaptation by universities of the course's didactic materials and pedagogy, advancing earthen architecture as a field of study. This in turn contributed to the creation in 1998 of the UNESCO Chair of Earthen Architecture—Constructive Cultures and Sustainable Development, based at CRATerre. These developments then led to the EAI *Guidelines for the Teaching of Earthen*



Participants in the PAT96 course, held at the archaeological site of Chan Chan in Trujillo, Peru. The course offered specialized training in earthen architecture conservation. Photo: Getty Conservation Institute.

Conservation, a series of teaching and learning resources adapted from the course materials and available on the GCI website.

FIELDWORK

Much has evolved in the field of earthen conservation since the GCI work at Fort Selden. The GCI's approach to fieldwork has also evolved since then. After Fort Selden, the emphasis on implementing discrete interventions has developed into a holistic approach toward preserving earthen sites, while also designing solutions for problems that potentially have wider impact.

An early example of more comprehensive conservation intervention is the Mogao Grottoes site stabilization work in the early 1990s, where windbreak fences were installed to mitigate windblown sand, and both environmental and color stability monitoring were carried out. A similar approach was implemented when Terra collaborated in the development of the management plan for the archaeological site of Chan Chan while carrying out the PAT96 and PAT99 courses. This holistic

approach was later applied to the Triple Arched Gate in Tel Dan, Israel, in 2000.

Terra and later the EAI promoted comprehensive planning as a powerful tool for the conservation of earthen sites, while recognizing the need to investigate specific interventions to address other issues jeopardizing such sites. In recent decades, special attention has been paid to the vulnerability of earthen buildings and the importance of adapting historic earthen urban settlements to safe and modern living conditions. In the last five years, the EAI has carried out model projects that seek to improve the way conservation interventions are carried out in two major areas: seismic retrofitting and rehabilitation of historic earthen buildings.

In 2009 the GCI initiated the Seismic Retrofitting Project (SRP) with the objective of adapting GSAP techniques to better match the equipment, materials, and technical skills available in many countries with earthen sites. Using four Peruvian historic earthen buildings representing typologies across Latin America, the GCI—in collaboration with the Ministerio de Cultura del Perú, the Escuela de Ciencias e Ingeniería of the Pontificia Universidad Católica del Perú, and the University of Minho, Portugal—is designing, testing, and implementing seismic retrofitting techniques and maintenance programs with locally available materials that will improve the structural performance and safety of earthen buildings while minimizing loss of historic fabric. The Department of Architecture and Civil Engineering at the University of Bath and the Department of Civil, Environmental and Geomatic Engineering at University College London also have been SRP partners from 2010 to 2012 and from 2013 to 2014, respectively.

The Conservation and Rehabilitation Plan for the earthen ensemble of Taourirt in southern Morocco is another EAI model project—this one carried out in partnership with Morocco’s Centre de Conservation et de Réhabilitation du Patrimoine Architectural des zones atlasiques et subatlasiques. The project seeks to develop a methodology for the conservation and rehabilitation of this traditional earthen ensemble that can be used as a model for similar earthen sites across the Maghreb. The objective is to establish a conservation process that demonstrates appropriate reuse of such sites, respects the original building fabric, and preserves technical know-how.

NEXT STEPS

From its establishment, the GCI has contributed to the earthen architecture field by developing model projects and training programs, researching unanswered questions, and disseminating information on appropriate conservation interventions. Looking ahead, what is further needed to advance the field, and what role could the GCI play?

The body of information thus far produced in the field of earthen conservation emphasizes regular maintenance as a preventive measure for damage control. Earthen buildings were

conceived and constructed to be maintained by the societies that erected them. Finding solutions for suitable maintenance programs in the countries with earthen heritage should be one of the next steps. Developing proper maintenance practices will require greater understanding of earth and the way it behaves at the material and structural level.

Notwithstanding the increase in international conferences and training programs, many regions of the world urgently need more education and assistance to bolster the conservation of their earthen sites. The GCI hopes that its endeavors in earthen architecture can contribute to more broadly advancing the field, particularly in those areas where such conservation efforts are lacking.

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Earthquake-damaged Ica Cathedral in Peru, one of four earthen buildings being studied as part of the GCI’s Seismic Retrofitting Project. Photo: Claudia Cancino, GCI.



CONSERVATION OF DECORATED SURFACES

BY FRANCESCA PIQUÉ AND LESLIE RAINER

THE CONSERVATION CHALLENGES PRESENTED BY DECORATED surfaces are complex for numerous reasons, including the heterogeneous materials used, the variation in size, the different types of decoration, and the intimate link of the decorations to the structures they adorn. The variety of decorated surfaces is as broad as the range of cultures that create them. From prehistoric rock art to ancient Roman mosaics to contemporary street art, we as humans have always had the impulse to embellish, beautify, and give meaning to our built environment.

Decorated surfaces can be two-dimensional, as in mosaics and wall paintings—or three-dimensional, as in sculpted or carved relief and ornamental stucco decoration. They are generally characterized by their size and heterogeneous composition, made with materials that include earth, lime, cement, and gypsum plasters; various paints, glazes, and coatings; and stone and glass tesserae; all applied to a variety of primary supports. The layering of these different materials creates a surface that is often of high quality and refinement, imbued with decorations that contain artistic and technical values, cultural significance, and meaning that may be symbolic, religious, or political. The surface is at the interface between the building and the environment and is particularly vulnerable because it is both exposed to external forces and intimately linked to a building system. Collectively, these characteristics constitute the fundamental conservation challenges for decorated architectural surfaces.

PROJECTS ON DECORATED SURFACES

In different parts of the world—and at various scales with different objectives—the GCI has conducted projects addressing the conservation issues of wall paintings, archaeological and historic mosaics, and bas-reliefs.

The first GCI field project, initiated in 1986, was the conservation of the thirty-two-hundred-year-old tomb of Queen Nefertari in the Valley of the Queens, conducted with the Egyptian Antiquities Organization (now the Ministry of State for Antiquities); that effort focused on the tomb's wall paintings. In 1987, the GCI began working with the City of Los Angeles on a challenging project to conserve, protect, and interpret *América Tropical*, a highly political twentieth-century mural on cement-based plaster by the Mexican muralist David Alfaro Siqueiros. It would be difficult to find two examples of wall paintings so different—from the cultures that made them to the materials and techniques of execution, as well as the conservation issues presented. However, the conservation methodology in both projects was similar, with a strong component of study before intervention. In each case, post-treatment monitoring and maintenance plans were developed and implemented.

The GCI has followed a methodological approach in its projects, in close collaboration with its partners. Projects are developed and interventions planned systematically, in the context of a sound management structure, with interdisciplinary teams comprising professionals from different and complementary specialties. This methodology has ensured a strong scientific approach essential to under-

América Tropical, a 1932 mural by David Alfaro Siqueiros in downtown Los Angeles, where the GCI and the City of Los Angeles were engaged in a long-term project to conserve, interpret, and provide public access to the mural. Photo: Stacey Rain Strickler, J. Paul Getty Museum.

standing the materials to be conserved, the environment surrounding the object, and the causes and the mechanisms of deterioration, with the goal of developing and assessing conservation interventions.

A crucial component of GCI field projects on decorated surfaces is scientific research. Material analysis has furthered understanding of original materials and techniques and of agents of deterioration. Conservation of the medieval mosaic on the facade of St. Vitus Cathedral in Prague, begun in the 1990s, is a noteworthy example of a GCI project with a strong scientific component. The glass mosaic adorning the exterior of this highly visited church presented a centuries-old problem of corrosion of the glass tesserae. The main focus of the project, conducted with the Office of the President of the Czech Republic, was the extensive scientific research to develop a protective coating to prevent renewed corrosion of the glass after cleaning.

In addition to field projects with integral scientific components, the GCI has undertaken focused scientific research to tackle specific conservation issues, including evaluation of techniques to identify organic materials in wall paintings, injection grouts for decorated architectural surfaces, backing plasters for detached mosaics, and anti-graffiti coatings for modern murals.

The GCI has also addressed broader issues in the management of sites with decorated surfaces. The close link between site management and decorated surfaces conservation is exemplified by decades-long GCI work at the Mogao Grottoes in China, where appropriate site management has been integrated into the conservation of the wall paintings in the decorated cave temples. The project—a collaboration with the Dunhuang Academy, the stewards of the site—has focused on sustainable visitor and site management in addition to wall paintings conservation.

Education and training have also been emphasized by the GCI, with efforts ranging from integrated training on field projects to developing a university program on the conservation of wall paintings. An early GCI initiative was the creation in 1985 of a degree program in the conservation of wall paintings at the Courtauld Institute of Art, University of London. This program, begun as a partnership, has continued independently and is now a leader in training wall paintings conservators, with fieldwork in Europe and Asia. Today, many Courtauld graduates are practicing conservators and hold prestigious positions in the field.

Training in mosaic conservation has long been a GCI effort, starting with a collaboration with Tunisian authorities—part of the Institute’s mosaics in situ conservation project—begun in 1998 to train conservation technicians to conduct monitoring and maintenance operations. This work evolved into the MOSAIKON initiative, a current GCI partnership with the Getty Foundation, ICCROM (the International Centre for the Study of the Preservation and Restoration of Cultural Property), and ICCM (the International Committee for the Conservation of Mosaics), which aims to improve the conservation, presentation, and management of sites with mosaics through a number of interrelated activities. The initiative has continued the training of conservation technicians and has offered training for decision makers and site managers of archaeological sites with mosaics. It has also sought to

strengthen the network of professionals addressing conservation, maintenance, and management of mosaic heritage and to promote the dissemination and exchange of information.

Indeed, dissemination has been an important GCI activity in the conservation of decorated surfaces. The Institute has organized symposia and colloquia and has published proceedings from these meetings, disseminated results of field projects, and made online resources available to conservators. One colloquium specifically addressed the conservation of decorated surfaces on earthen architecture, and another, “Mural Painting and Conservation in the Americas” (co-organized by the GCI and the Getty Research Institute), brought together conservators and allied professionals working on modern murals.

Through research and training, and through the methodological approach taken in its many field projects, the GCI has contributed to the conservation of decorated surfaces. Projects that testify to the efficacy of the methodological approach include the St. Vitus mosaic, Cave 85 at the Mogao Grottoes, polychrome earthen bas-reliefs from the Royal Palaces of Abomey in Benin (1992–97), and *América Tropical*; currently the tomb of Tutankhamen in Egypt (in partnership with the Ministry of State for Antiquities) and the tablinum of the Casa del Bicentenario in Herculaneum (in partnership with the Herculaneum Conservation Project and La Soprintendenza Speciale per Pompei, Ercolano e Stabia) are examples of the process in practice.

The overall lesson from all of these projects is that a meth-



The fourteenth-century mosaic on St. Vitus Cathedral in Prague. Working with Czech authorities and conservators, the GCI studied the causes of the mosaic’s deterioration, developed a conservation strategy and a system for its protection, restored and conserved the mosaic, and developed a long-term maintenance plan. Photo: Dusan Stulik, GCI.



The tablinum of the Casa del Bicentenario in Herculaneum, where the GCI is collaborating on a project to study and conserve the tablinum's decorated architectural surfaces, as a pilot field project. Photo: Scott S. Warren, for the GCI.

odological approach to the conservation of decorated surfaces as integral components of the building systems or sites to which they belong is essential to their long-term preservation.

LOOKING BACK, LOOKING FORWARD

In the past, the conservation of decorated surfaces was primarily the task of a conservator-restorer or a team of conservator-restorers and technicians. A project would have some scientific support but would likely rely on the knowledge, experience, and judgment of the conservator-restorers. Projects today are more interdisciplinary, and many experts collaborate to characterize materials, study deterioration, design treatments, and conduct monitoring. The projects use an integrated approach: passive and remedial measures are employed not only to treat the architectural and decorated elements, but also to mitigate aggressive environmental conditions and monitor the treatment over time. Treatment is just one component of a project. It is systematically preceded by diagnostic investigations and testing and followed by post-treatment monitoring and maintenance. With contributions by members of a multidisciplinary team, the project is more effective and sustainable.

The evolution of technology has enormously affected the field. Tools used for documentation, scientific investigations, and diagnostic studies have advanced tremendously, and the ease and capacity of data collection and management have improved significantly. Instruments previously confined to the laboratory have become portable and more affordable; they are increasingly available for in situ examination and analysis, allowing conservators to do more for less, and to carry out on-site diagnostic and analytical investigations as noninvasive or minimally invasive operations. Materials analysis has also advanced. The type of information that can be obtained from mere traces of material is impressive, furthering an understanding of the original materials and decoration techniques. Moreover, in situ investigation allows conservators to identify previous intervention materials and assess conditions and treatment options.

A GCI contribution to this research was the Organic Materials in Wall Paintings project (2003–10). Starting from noninvasive and moving to minimally invasive tools, the project, conducted with a number of mostly Italian institutions, developed a methodology for

on-site investigation to identify organic materials in wall paintings. The project's objective was to advance wall paintings conservation by improving methods of identifying organic materials, which are especially vulnerable to interventions, particularly cleaning.

Another critical development has been the establishment of university and other programs that specialize in scientific study and specifically address cultural heritage conservation. The proliferation of such programs has meant that conservator-restorers are increasingly trained in a broad range of conservation topics, and there are now far more professionally trained conservators, scientists, and specialists in cultural heritage preservation who apply their expertise to the complex problems of in situ conservation of decorated surfaces.

Within the GCI, both the scope and the scale of decorated surfaces projects have shifted over thirty years. Early GCI projects focused on single objects, such as the tomb of Nefertari, the Orpheus Mosaic in Cyprus (1988–89), and the bas-reliefs of the Royal Palaces of Abomey. These projects targeted conservation of an individual wall painting, a mosaic, or a set of polychrome earthen bas-reliefs, and the conservation issues were specifically linked to these elements, even if scientific study, post-treatment monitoring, and maintenance were always integral to the project.

As the Institute matures, it is taking an even broader look at decorated surfaces as parts of larger structures or sites and is treating wall paintings in the context of more comprehensive projects. An example is the current conservation of wall paintings in the seventeenth-century church in Kuño Tambo, Peru, which is a component of the GCI's Seismic Retrofitting Project, whose objective is the design of seismic retrofitting of earthen buildings. Similarly, wall paintings stabilization in the tombs of the Valley of the Queens was but one component of a much larger GCI project with Egyptian officials that addressed conservation issues in the whole valley.

FURTHER CHANGES

As the field progresses, the additional development of portable tools and instruments will further improve methods for documentation, diagnostic investigation, and in situ treatment evaluation to better identify and mitigate deterioration.

The integrated approach brought to a project by a multidisciplinary team working with committed partners and stakeholders will provide more comprehensive assessments of conditions and conservation options for a site. This, in turn, can reduce the need for large-scale interventions and ensure sustainable conservation solutions for decorated surfaces in the context of the buildings or sites to which they are inextricably linked, thus better preserving the extraordinary variety of decoration embellishing the heritage that surrounds us.

Francesca Piqué, formerly with the GCI, is a professor of science in conservation at the University of Applied Sciences and Arts in Lugano, Switzerland, where she conducts research and teaches the master course in conservation of decorated surfaces. Leslie Rainer, a GCI senior project specialist and wall paintings conservator, is manager of the GCI's collaborative project to conserve decorated architectural surfaces in the tablinum of the Casa del Bicentenario at Herculaneum.

THE MODERN AND CONTEMPORARY ART RESEARCH INITIATIVE



BY TOM LEARNER AND JIM CODDINGTON

THE GCI'S MODERN AND CONTEMPORARY ART RESEARCH Initiative¹ (ModCon) has been a major component in the Institute's overall research portfolio since its official launch in 2007. By then, our interest and involvement in the conservation issues of modern and contemporary art had been growing for years, as had that of many other institutions and colleagues. One of the Institute's first activities in this area was the 1998 conference "Mortality Immortality? The Legacy of 20th-Century Art." This Getty event sought to foster a cross-disciplinary discussion among artists, art historians, collectors, conservators, and curators—collaboration that has now become the norm. Later, in 2002, as many research groups had begun to scientifically explore modern materials used in contemporary art, the GCI started a long-term study of conservation issues of modern paints, initially in collaboration with Tate, London, and the National Gallery of Art, Washington, DC.

Although a relatively recent addition to the GCI portfolio, ModCon is now in full swing, and it is not too soon to reflect on some of the advances made in the field since then and on how needs are evolving.

ModCon was launched in response to a growing realization within the conservation profession that research in this area was a priority. Many key issues had already been identified, including broad philosophical and ethical matters and specific materials questions. Ethical dilemmas concerning the conservation and care of contemporary art have led to uncertainty in the art world. For example, an artist's wish to refabricate a deteriorated work to recapture the object's original appearance—frequently, if problematically, referred to as "the artist's intention"—challenges conservation ethics on reversibility and conservation of original materials. Similarly, replacing obsolete technological elements of a technology-based work raises questions of how closely such a work now reflects the original, both materially and intellectually, and what role conservation plays in making that determination.

The vast increase in the variety of materials used by artists to create works is a significant practical problem, since each of these materials has its own, often unique, set of aging properties, as well as display or storage requirements. Materials that are inherently unstable quickly show signs of deterioration and are, of course, of great concern to conservators. (One commonly cited example is early cellulosic plastics used in twentieth-century sculpture and

A January 2013 meeting of experts convened by the GCI and the Getty Museum to discuss the conservation of Jackson Pollock's *Mural*, (1943). Painting: University of Iowa Museum of Art, Gift of Peggy Guggenheim, 1959.6. Reproduced with permission from the University of Iowa. Photo: Stacey Rain Strickler, J. Paul Getty Museum.

design items; these are capable of sudden and drastic degradation that can quickly result in objects becoming impossible to display.) The seemingly limitless range of materials can leave the conservator of contemporary art hard-pressed in many cases to find well-tested conservation materials for a treatment, and conservators often have to undertake remedial treatments that have not been fully evaluated. This problem is intensified when there is, on the part of the owner or artist, a low tolerance for any sign of aging; intervention may then be required comparatively early in the life of the object.

From the outset, the GCI adopted a broad approach to its involvement in this area, developing a range of focused scientific research projects with a number of partners and establishing a comprehensive strategy for information dissemination and sharing—vital for making the research and thought accessible to the field.

RESEARCH ACTIVITIES

Much GCI scientific research to date has focused on the study of synthetic polymers, whether used as plastics, resins, or paints. Early work developed analytical methods for the identification of these new materials before moving into monitoring and assessing polymer stability and evaluating the effectiveness and potential dangers of conservation treatments.

One large project with GCI participation, Preservation of Plastic Artefacts in Museum Collections (POPART), ran from 2008 to 2012. This collaboration—coordinated by the Centre de Recherche sur la Conservation des Collections, Paris—included a consortium of mostly European research laboratories, making possible far more rapid developments into appropriate analytical methods for plastics than could have been achieved individually. As a result, clear analytical protocols were established that are now being used by the field. Additionally, collection surveys were compared, extensive degradation studies carried out on a selection of plastics, and a range of conservation treatments explored.



A panel at the “Object in Transition” conference, held at the Getty Center in 2008. Photo: Getty Research Institute. Background photo: Artist Eva Hesse with *Expanded Expansion* at the 1969 exhibition “Anti-Illusion: Procedures/Materials” at the Whitney Museum of American Art, New York. © The Estate of Eva Hesse (photographer unknown).

The GCI Modern Paints project has been running even longer. Following the “Modern Paints Uncovered” symposium held at Tate Modern in 2006, its work has focused extensively on assessing the effects of cleaning acrylic emulsion paints. In partnership with Tate and the Dow Chemical Company, the project has developed and evaluated a range of novel cleaning systems that are now generating a series of workshops, as discussed below.

A more recent project on outdoor sculpture initially studied paint systems for harsh outdoor environments. Although some analysis of different types of paint has been done, more attention has been paid to developing protocols for artist studios, estates, and foundations for agreement on reference paint coupons with approved surfaces, color, and gloss.

CLEANING OF ACRYLIC PAINTED SURFACES WORKSHOPS

Even when a great deal of scientific research is done in conservation areas, the knowledge gained from that research is not always readily transferred to practicing conservators. There is also a temptation for researchers to pursue interesting lines of research that may deviate from the initial questions posed by conservators. Workshops offer an excellent opportunity to take stock of recent research and examine its interpretation and implementation by conservators. One area where the GCI has devoted significant attention in developing workshops is the cleaning of acrylic paintings.

To date, five workshops have been held under the Cleaning of Acrylic Painted Surfaces (CAPS) banner. These workshops have brought together groups of conservation professionals to test the new methods developed from earlier GCI work on acrylic paint media, providing feedback from field practice and highlighting areas requiring further research. An early CAPS workshop—held at the Museum of Modern Art, New York, and involving local conservators from both institutional and private practice—sought to build on the local conservation community and to facilitate the sharing of information and experiences within the group after the workshop. Subsequent workshops have been held in London, Sydney, Ottawa, and Washington, DC.

“THE OBJECT IN TRANSITION” CONFERENCE

Although a major undertaking, conferences and symposia remain an essential component of any strategy for improving information sharing and dissemination. In 2008 the GCI and the Getty Research Institute (GRI) organized “The Object in Transition: A Cross Disciplinary Conference on the Preservation and Study of Modern and Contemporary Art.” This Getty Center conference focused on the conservation of contemporary sculpture, painting, and mixed-media artworks and fostered greater dialogue among conservators, artists, art historians, and curators about conservation issues impacting contemporary artworks, primarily via intensive reflections on specific case studies and in general panel discussions. Artists discussed included Eva Hesse, Sol LeWitt, Roy Lichtenstein, Piet Mondrian, Bruce Nauman, Barnett Newman, David Novros, and James Turrell.



A GCI-organized workshop on the cleaning of acrylic painted surfaces, held in 2011 at the Museum of Modern Art in New York. Photo: Tram Vo, GCI.

A number of relevant artworks—some no longer displayed at their institutions because of their deterioration—were exhibited in a special gallery at the Getty Museum, enabling conference participants to contribute more fully in the discussion of them. The entire conference was videotaped and is viewable online at getty.edu. It has achieved some impressive viewing numbers; for example, the session on Piet Mondrian's *Victory Boogie-Woogie* has been viewed over six thousand times.

EXHIBITIONS

Exhibitions are becoming an important tool in overall dissemination strategies, providing a means of raising awareness of current conservation issues within a wider community than our core professional audience. To date the GCI has been involved with two exhibitions, *Jackson Pollock's "Mural"* in 2014, and *From Start to Finish: De Wain Valentine's "Gray Column,"* the GCI contribution to the Pacific Standard Time exhibitions of 2011–12.

Jackson Pollock's seminal work *Mural* (1943), owned by the University of Iowa Museum of Art, was the focus of a major conservation and research project by the GCI, the Getty Museum, and the GRI, culminating in the exhibition. The newly conserved painting was displayed in one gallery, and the research undertaken and conservation decisions made by the GCI and the Museum were presented in a second. The exhibition covered the two main aspects of the GCI's role in the project: the salient features of an in-depth technical study of the painting and a description of some of the choices made during the conservation treatment.

The earlier exhibition, *From Start to Finish*, was dedicated to the materials and fabrication processes used by artist De Wain Valentine. Valentine was unique among his contemporaries in that he developed, in collaboration with a polymer chemist, a new type of polyester resin that allowed him to create very large polyester sculptures. The exhibition described how *Gray Column*, an extraordinary artwork never before displayed in public, was made—from the casting of the resin to the extensive polishing required to achieve the final, perfectly smooth finish. The exhibition also explored practical and ethical issues in the conservation of this work. For example, how pristine should the piece look almost forty years after its

creation? And should its surface be made even smoother, now that sandpaper is available in much finer grades than it was in the 1970s?

THE ARTIST'S MATERIALS

The GCI also initiated a drive to expand the publication of other research in the field of modern and contemporary art conservation. A number of books are already available, and many more are planned. One of the main areas of current activity is a series called *The Artist's Materials*. These books look in depth at the materials and techniques of a number of influential twentieth-century artists and examine their implications for the conservation of the artists' work. Three are already published—one on Willem de Kooning (by Susan F. Lake), another on Jean Paul Riopelle (by Marie-Claude Corbeil, Kate Helwig, and Jennifer Poulin), and a third on Lucio Fontana (by Pia Gottschaller). Five more are in production.

LOOKING AHEAD

It has been eight years since the GCI embarked on its long-term research initiative to study the conservation of modern and contemporary art, and its broad portfolio of projects and events is likely to last for at least eight more. The challenges and priorities remain ever present, after all. But how has the field changed in those years, and how should this initiative respond to those changes and others in the field?

Even in this relatively short period, there appears to have been a shift away from what might be described as controlled panic, when the conversation was dominated by the enormous problems facing the profession and the paucity of obvious solutions. Something of a reality check has seeped into the thinking of many conservators: a lot of modern and contemporary art simply cannot last, and we should therefore perhaps stop obsessing about it. There will always be limits to what we can really do, given all the constraints.

Conversely, there has also been a somewhat reluctant shift toward the notion that documenting works of art is not a sufficient strategy in itself. There are clear advantages to the high level of documentation now occurring on many types of contemporary art, and there are undoubtedly valuable technologies just around the corner that will even record experiences and sensations. But there are also times when, beyond documentation, conservation decisions must be made and treatments undertaken.

How then does one design a research strategy acknowledging these facts of life in contemporary art conservation? On the one hand, by accepting the inevitable, we admit that we have to choose our agenda wisely, in ways that address truly significant, though difficult, problems. In a more positive vein, difficulty is in fact a strength, since complexity and uncertainty are actually embraced. This embrace is, after all, not unlike the stance of the very artists whose work we seek to understand and preserve.

Tom Learner is head of GCI Science. Jim Coddington is the Agnes Gund Chief Conservator at the Museum of Modern Art, New York.

1. www.getty.edu/conservation/our_projects/science/modcon/

SELECTED GCI PUBLICATIONS 1985–2015

1985–95

The Nature of Conservation: A Race against Time, by Philip R. Ward (1986).

Between Two Earthquakes: Cultural Property in Seismic Zones, by Bernard M. Feilden (1987). Published jointly with ICCROM.

6th International Conference on the Conservation of Earthen Architecture, edited by Neville Agnew, Michael Taylor, Alejandro Alva Balderrama, and Hugo Houben (1990).

Art and Eternity: The Nefertari Wall Paintings Conservation Project, 1986–1992, edited by Miguel Angel Corzo and Mahasti Ziai Afshar (1993). Published jointly with the Egyptian Antiquities Organization, Cairo.

1996–2000

Historical and Philosophical Issues in the Conservation of Cultural Heritage, edited by Nicholas Stanley Price, M. Kirby Talley, Jr., and Alessandra Melucco Vaccaro (1996). First in the Readings in Conservation series.

House of Eternity: The Tomb of Nefertari, by John K. McDonald (1996). First in the Conservation and Cultural Heritage series.

Stone Conservation: An Overview of Current Research, by Clifford A. Price (1996). Research in Conservation series.

The Conservation of Archaeological Sites in the Mediterranean Region, edited by Marta de la Torre (1997).

Oxygen-Free Museum Cases, edited by Shin Maekawa (1998).

The Structural Conservation of Panel Paintings: Proceedings of a Symposium at the J. Paul Getty Museum, edited by Kathleen Dardes and Andrea Rothe (1998).

Building an Emergency Plan: A Guide for Museums and Other Institutions, by Valerie Dorge and Sharon L. Jones (1999).

The Conservation Assessment: A Proposed Model for Evaluating Museum Environmental Management Needs, by Kathleen Dardes, Erica C. Avrami, Marta de la Torre, Samuel Y. Harris, Michael Henry, and Wendy Claire Jessup (1999).

Economics and Heritage Conservation: A Meeting Organized by the Getty Conservation Institute, December 1998, Getty Center, Los Angeles, edited by Randy Mason (1999).

Mortality Immortality? The Legacy of 20th-Century Art, edited by Miguel Angel Corzo (1999).



Photo: Anna Flavin, GCI

2001–05

Copper and Bronze in Art, by David A. Scott (2002).

Management Planning for Archaeological Sites, edited by Gaetano Palumbo and Jeanne Marie Teutonico (2002).

Planning and Engineering Guidelines for the Seismic Retrofitting of Historic Adobe Structures, by E. Leroy Tolles, Edna E. Kimbro, and William S. Ginell (2002).

A Guide to the Preventive Conservation of Photograph Collections, by Bertrand Lavédrine (2003). First in the series of books on photograph conservation published by the GCI.

Principles for the Conservation of Heritage Sites in China, edited by Neville Agnew and Martha Demas (2004).

Solvent Gels for the Cleaning of Works of Art: The Residue Question, by Dusan Stulik, David Miller, Herant Khanjian, Narayan Khandekar, Richard Wolbers, Janice Carlson, and W. Christian Petersen (2004).

Heritage Values in Site Management: Four Case Studies, by Marta de la Torre, Margaret G. H. MacLean, Randall Mason, and David Myers (2005).

Issues in the Conservation of Paintings, edited by David Bomford and Mark Leonard (2005). Readings in Conservation series.

2006–10

Stories in Stone: Conserving Mosaics of Roman Africa, edited by Aïcha Ben Abed (2006).

Lessons Learned: Reflecting on the Theory and Practice of Mosaic Conservation, edited by Aïcha Ben Abed, Martha Demas, and Thomas Roby (2008).

Modern Paints Uncovered, edited by Thomas J. S. Learner, Patricia Smithen, Jay W. Krueger, and Michael R. Schilling (2008).

Conservation of Ancient Sites on the Silk Road: Proceedings of the Second International Conference on the Conservation of Grotto Sites, edited by Neville Agnew (2010).

Issues in the Conservation of Photographs, edited by Debra Hess Norris and Jennifer Jae Gutierrez (2010). Readings in Conservation series.

Stone Conservation: An Overview of Current Research, 2nd ed., by Eric Doehne and Clifford A. Price (2010). Research in Conservation series.

Willem de Kooning: The Artist's Materials, by Susan F. Lake (2010). First in the Artist's Materials series.

2011–15

Changing Views of Textile Conservation, edited by Mary M. Brooks and Dinah D. Eastop (2011). Readings in Conservation series.

Terra 2008: The 10th International Conference on the Study and Conservation of Earthen Architectural Heritage, edited by Leslie Rainer, Angelyn Bass Rivera, and David Gandreau (2011).

Archaeological Sites: Conservation and Management, edited by Sharon Sullivan and Richard Mackay (2013). Readings in Conservation series.

The Conservation of Cave 85 at the Mogao Grottoes, Dunhuang: A Collaborative Project of the Getty Conservation Institute and the Dunhuang Academy, edited by Lori Wong and Neville Agnew (2013).

Historical Perspectives on Preventive Conservation, edited by Sarah Staniforth (2013). Readings in Conservation series.

Twentieth-Century Color Photographs: Identification and Care, by Sylvie Pénichon (2013).

Historical Perspectives in the Conservation of Works of Art on Paper, edited by Margaret Holben Ellis (2014). Readings in Conservation series.

GCI News

Project Updates

WORK WITH DISNEY ARL CONTINUES

The Walt Disney Animation Research Library (ARL) and the Getty Conservation Institute (GCI) announced the second phase of their ongoing collaborative research into the conservation of Disney animation cels. Over the course of this four-year-long phase, scientists and conservators from the GCI and ARL will investigate optimal storage conditions for cels, as well as strategies for reattaching flaked and delaminated paints to the plastic surface. The continued research is made possible by a generous contribution from the Walt Disney Company.

The ARL and GCI began their collaboration in 2009, when the ARL provided the GCI with access to over two hundred thousand cels from the 1920s to late 1980s housed in their climate-controlled facility. GCI researchers analyzed and differentiated three types of plastic used to produce animation cels—cellulose nitrate, cellulose acetate, and Mylar (polyester). They also assessed the condition of sample cels, observing yellowing, warping,



An animation cel from the 1937 film *Snow White and the Seven Dwarfs*. Photo: ©Disney Enterprises, Inc.

cracking, shrinking, and delamination of paint.

To determine optimum storage conditions for cels—the most important factor in the overall strategy for preserving the collection—GCI researchers will investigate parameters such as mechanical behavior, moisture uptake, and rate of chemical degradation. While there is much research regarding best storage conditions for plastics, the storage conditions developed for this

project will be tested on painted cels, cel plastics, and paints. This research will be aided by the ARL's well-documented collection of animation cels and paint formula information, which spans many decades. To explore reattachment of paint to the cels, various minimally invasive procedures explored in phase one will continue to be evaluated, and best practices will be established for future conservation work.

The research will be performed by both GCI researchers and researchers from partner institutions. The spirit of cooperation and the lending of expertise undertaken as part of this collaboration can serve as a model for future partnerships in plastics conservation.

The ARL-GCI effort is at the center of the Preservation of Plastics project, one of the key components of the GCI's Modern and Contemporary Art Research Initiative.

MANAGING COLLECTION ENVIRONMENTS MEETING

In June the Managing Collection Environments Initiative convened researchers, conservation scientists, and conservators to explore ways epidemiological approaches could help in the investigation of the causal relationships between the environment of objects and mechanical damage to them. The meeting was held at



Meeting at Windmill Hill Archive at Waddesdon Estate. Photo: James Druzik, GCI. Painting by Tony Bevan: *Archive* (PC1412), 2014, © the artist. Courtesy Ben Brown Fine Arts, London. *Fragments Wall Lamp*, designed by Humberto and Fernando Campana and produced by Venini.



Mosaic conservation technicians from the Institut National du Patrimoine stabilizing and completing a large lacuna fill in the underground level mosaic of the Maison de la Chasse at Bulla Regia in Tunisia. Photo: Christopher Sprinkle, Getty Trust.

Windmill Hill Archive at Waddesdon Estate in the United Kingdom.

The question for those in attendance was whether epidemiology (a branch of medical science that deals with the incidence, distribution, and control of disease in a population) can be adapted for improving understanding of climate-induced damage in objects. The experts gathered to discuss this question are studying materials' behavior in fluctuating climatic conditions in a variety of projects; this was an opportunity to share experiences and explore ways to collaborate in this research.

During the meeting, participants worked toward an outline of a research methodology. The consensus was that prospective study designs (studies in which material response to fluctuating climatic conditions is monitored in real time) would provide the most reliable data, whereas retrospective studies (interpreting current objects' conditions by examining a variety of historic and present data such as images, reports, and climate documentation) could be useful for vetting hypotheses.

Participants also discussed sample size (the number of objects examined to generate representative data). They agreed that choosing specific and more sensitive monitoring techniques allows sample size to be reduced significantly, to manageable proportions. This specificity increases the importance of adapting the mechanical testing techniques of the laboratory and deploying them in the field.

At the meeting's end, participants organized themselves into several working groups that will explore specific topics in more detail: the sharing of large amounts of data, mechanical lab studies and their application in the field, and communication (including terminology, standards, and web tools). They also expressed the desire to collaborate by sharing project data and the hope of working together in future studies.

BULLA REGIA MODEL CONSERVATION PROJECT

In May at the Roman and Byzantine site of Bulla Regia in Tunisia, the GCI resumed its field

activities to conserve one of the most significant houses of the period, the Maison de la Chasse, after recent campaigns were interrupted or postponed because of security concerns. Together with technicians and workers from the Institut National du Patrimoine, the Institute is conserving and presenting to the public this entire building using methods that demonstrate best practices and long-term sustainability.

During this campaign, improvements to drainage in different rooms were carried out, and pavement areas previously covered with cement were provided with new lime mortar layers after careful removal of the cement. Different methods are being tested and employed for allowing visitors to explore and circulate through the house without walking on the ancient mosaic pavements, with the aim of reducing damage such visitation can cause to the fragile remains. Conservation planning for the hundreds of mosaics is continuing, as is implementation of emergency mosaic conservation measures across the site.

Heavy winter rains had caused on-site springs to overflow, which led to flooding of the under-

ground floor of one of the most important excavated houses, the Maison d'Amphitrite. With the assistance of pumps, the springwater eventually receded, and the GCI team was able to inspect the underground rooms and the condition of the mosaics and wall plasters. Though the immediate flood damage was minimal, continued water ingress will accelerate deterioration processes, including the oxidation of iron rebar of reinforced concrete support panels of the house's significant figurative mosaics. The GCI team is recommending that hydrology experts survey the site and determine the best water management approach to prevent future flooding of the buildings.

Recent Events

STAFF MEMBER RECEIVES ROME PRIZE

GCI Senior Project Specialist Jeffrey Cody was awarded the American Academy in Rome's 2015–16 Rome Prize Fellowship in Historic Preservation and Conservation for his project "Conserving the City by Understanding Its Built Landscape: The Analysis of Urban Form by Saverio Muratori, 1910–1973." He will research Saverio Muratori's methodology of "typomorphology" as it relates to Italian cities, particularly Rome and Venice after World War II, and through a better understanding of Muratori's methods adapt those methods to urban conservation in non-Italian contexts.

The Rome Prize Fellowship annually supports advanced independent work in the arts and humanities in a unique residential community in Rome. Rome Prize winners are selected by independent juries of distinguished scholars and artists through a national competition process in one of the eleven disciplines supported by the Academy.

STONE COURSE CONCLUDES

This past July the Nineteenth International Course on Stone Conservation concluded in Rome. A partnership of the GCI, ICCROM (International Centre for the Study of the Preservation and Restoration of Cultural Property), and the Non-Catholic Cemetery in Rome, the twelve-week course brought together twenty midcareer conservators, architects, scientists,

and engineers. Participants came from Palestine, Serbia, Canada, China, Colombia, the Philippines, Japan, Italy, Malta, Zimbabwe, Tanzania, Egypt, Peru, Spain, Georgia, Mexico, Poland, Macedonia, Finland, and Turkey.

This marks the fourth time the GCI has partnered with ICCROM to offer the stone course. The course took advantage of ICCROM's laboratories and library, as well as the opportunity to experience Rome's vast heritage of stone sculpture, buildings, and sites. Divided into modules, the course covered all aspects of stone conservation, including the history and theory of conservation; geological and material characteristics of stone; deterioration mechanisms and methods of survey and analysis; and conservation interventions and criteria for selecting and implementing treatments. More than thirty international experts in stone conservation led classroom lectures, laboratory exercises, and site visits. The course included a weeklong study tour of relevant sites, including marble quarries in Carrara and ongoing

conservation projects at the Pisa Cathedral and Venice's Rialto Bridge.

During the course, participants applied what they learned to conservation problems affecting historic tombs at the Non-Catholic Cemetery, the final resting place of many poets and artists, including John Keats and Percy Bysshe Shelley. The eight tombs studied ranged from a life-size marble sculpture to a colored stone sarcophagus, and they presented interesting conservation challenges, such as structural problems, soiling, and decay caused by biological growth. Course participants carried out a conservation project from start to finish, beginning with documentation, conditions assessment, and materials analysis, followed by implementation of conservation treatments, including structural stabilization, mortar repairs, cleaning, and consolidation.

The 2015 course provided an in-depth and intensive program and the chance to develop a professional network that will serve the participants throughout their careers.



Two participants in the stone conservation course making structural repairs to a tomb in Rome's Non-Catholic Cemetery. Photo: Benjamin Marcus, GCI.

Upcoming Events

ABSTRACT EXPRESSIONISM: TIME, INTENTION, CONSERVATION, AND MEANING

The Getty Conservation Institute, in collaboration with the Clyfford Still Museum Research Center, will present a daylong symposium, *Abstract Expressionism: Time, Intention, Conservation, and Meaning*, on November 12, 2015, at the Getty Center.

Abstract Expressionism was one of the most significant artistic movements of the twentieth century. Clyfford Still, Jackson Pollock, Mark Rothko, Barnett Newman, Willem de Kooning, and others employed new materials and techniques in art making that presented the medium of paint, and how it was applied, as an agent of expressive communication. Their works, many now over sixty years old, inevitably are aging, and their once-innovative techniques and physical choices present conservation challenges. These artists' works now exist in a unique moment, suspended between memories of them fresh and new—as if directly from the artist's studio—and their present appearance as historical artistic documents of a past era. The way scholars and conservators address these changes will impact future generations' understanding of the artists and the movement itself.

This one-day symposium will bring together conservators, conservation scientists, scholars, and others interested in Abstract Expressionism to discuss these developments and consider what should and should not be deemed acceptable change for the artworks, in view of their makers' intent and their meaning.

MEDIA IN TRANSITION CONFERENCE

The Getty Conservation Institute, the Getty Research Institute, and Tate will host a major international conference at Tate Modern in London November 18–20, 2015, focusing on the implications of collecting time-based media works of art and on related practices. This two-and-a-half-day conference aims to foster lively, interdisciplinary dialogue about the impact of technological change on an artwork and the

growing networks of professionals required to support contemporary media artworks and their conservation.

Can works change and evolve within the museum and still serve art history? What are the key moments of transition and engagement in the lives of time-based media artworks? Can works be created with future forms of display or realization in mind? How does collecting time-based media and performance change the frame in which we consider the conservation of other works? What are the implications for these works if the networks of production and expertise are lost? If we change the approach to conservation while working with artists now, can we also do that when these works have become historical rather than contemporary collections? In migrating a work, do we leave traces of its former life? What is the nature of the invitation to an artist when a work enters the museum collection, and how does that relationship evolve?

These themes will be explored through a number of sessions, organized around a case study or a specific theme. The conference will also include show-and-tell sessions to demonstrate the impact of a specific technological change on the experience of time-based media works of art. To find out more and register, please visit: www.tate.org.uk/whats-on/tate-modern/conference/media-transition.

SCHOLAR APPLICATIONS NOW BEING ACCEPTED

The Conservation Guest Scholar program provides an opportunity for conservation leaders to pursue research that advances conservation practice and contributes new ideas to the field. Successful candidates are in residence at the Getty Center for periods of three, six, or nine months and are chosen by a professional committee through a competitive process.

Instructions, application forms, and additional information are available online in the "How to Apply" section of the Getty Foundation website. The 2016–17 Conservation Guest Scholar program application deadline is November 3, 2015.

2015–16 CONSERVATION GUEST SCHOLARS

Alain Colombini

Independent Scholar

"The Use of Spray Paints by Street Art Artists and the Relevant Implications in Conservation"
September 21–December 11, 2015

Margaret Holben Ellis

Eugene Thaw Professor of Paper Conservation at the Conservation Center Institute of Fine Arts, New York

"A Comprehensive Literature Review in Support of 'Multiple Originals or Original Multiples: Jean Dubuffet's *Imprints*'"
September 21–December 11, 2015

David Hallam

Independent Scholar

"The Characterization and Conservation of Oxide Coatings on Modern Metals"
September 21–December 11, 2015

Maria Isabel Hernandez Llosas

Independent Scholar

"Rock Art: The Forgotten Humankind Heritage"
April 4–June 24, 2016

Colm Murray

Independent Scholar

"A Conceptual Framework for Built Environment Cultural Heritage Values"
January 4–March 25, 2016

David Saunders

Independent Scholar

"Museum Lighting: A Guide for Conservators and Curators"
January 4–March 25, 2016

Thea van Oosten

Independent Scholar

"A Matter of Choice: Properties of Plastics for Conservation"
January 4–March 25, 2016

Elizabeth Vines

Independent Scholar

"Streetwise Design: New Development in Creative Heritage Cities"
April 4–June 24, 2016



Cave 85 at China's Mogao Grottoes, where the GCI has been working with the Dunhuang Academy on conservation and management of this World Heritage Site. Photo: Anna Zagorski, GCI.

GRADUATE INTERNSHIP PROGRAM

Applications are now being accepted for the 2016–17 Getty Graduate Internship program. These internships are full-time positions for students who intend to pursue careers in fields related to the visual arts. Programs and departments throughout the Getty provide training and work experience in areas such as curatorship, education, conservation, research, information management, public programs, and grant making.

The GCI pursues a range of activities dedicated to advancing conservation practice, in order to enhance the preservation, understanding, and interpretation of the visual arts. Twelve-month internships are available in the GCI's Collections, Buildings and Sites, and Science departments.

Instructions, application forms, and additional information are available online in the "How to Apply" section of the Getty Foundation website. For further information, contact the Getty Foundation at gradinterns@getty.edu. The application deadline is December 1, 2015.

2015–16 GRADUATE INTERNS

Oriol Dominguez

University of Padua and University of Minho
Earthen Architecture Initiative

Ashley Freeman

Queen's University, Ontario
Managing Collection Environments

Nityaa Iyer

University of Pennsylvania
MOSAIKON: Bulla Regia Model
Conservation Project

Xiao Ma

University of California, Los Angeles
MOSAIKON: Alternative Backing Methods
for Lifted Mosaics

Alexia Soldano

Université Paris I Pantheon-Sorbonne
Treatment Studies Research

CAVE TEMPLES OF DUNHUANG EXHIBIT

In July the Getty formally announced the upcoming exhibition *Cave Temples of Dunhuang: Buddhist Art on China's Silk Road*. Organized by the Getty Conservation Institute, the Getty Research Institute (GRI), the Dunhuang Academy, and the Dunhuang Foundation, the exhibition will celebrate over twenty-five years of collaboration between the GCI and the Dunhuang Academy to conserve and protect the Mogao caves.

With their exquisite wall paintings and sculptures, the Mogao caves bear witness to the intense religious, artistic, and cultural exchanges along the Silk Road, the trade route linking East and West. Paintings on silk, textiles, drawings, and manuscripts on loan from the British Museum, the British Library, the Musée Guimet, and the Bibliothèque Nationale of France—objects that have rarely, if ever, traveled to the United States—will be on view, as will rare books and maps from the GRI's Special Collections.

Among the objects to be exhibited is the *Diamond Sutra* (a sacred Mahayana Buddhist text) from the year 868. The *Diamond Sutra* is the world's oldest dated complete printed book. It was found, as were all the other objects to be exhibited, in Cave 17, also known as the Library Cave, where some fifty thousand objects, sealed up for a millennium, were discovered in 1900. In addition, three full-size cave replicas, hand painted by artists at the Dunhuang Academy, will be installed on the Getty Center's plaza, allowing visitors to experience the cave temples for themselves and to learn about their conservation.

The Robert H. N. Ho Family Foundation is the Presenting Sponsor of the exhibition. Lead Corporate Sponsor for the exhibition is East West Bank, and Lead Sponsor for the exhibition is the Henry Luce Foundation.

The exhibition will be on view from May 7 through September 4, 2016.

“KEEP IT MOVING? CONSERVING KINETIC ART”

The Getty Conservation Institute, the Museo del Novecento, and the Modern Materials and Contemporary Art working group of ICOM-CC, in partnership with INCCA, announce this conference on the preservation of kinetic art to be held in Milan, June 30–July 1, 2016, immediately prior to the 2016 ICOM General Conference.

Kinetic art not only includes movement, but often depends on it to be fully realized. Kinetic works of art exhibit a wide variety of motion, from motorized and electrically driven movement to motion resulting from wind, light, or other sources of energy. The dichotomy often noted in conservation of contemporary art, between original materials and the functionality of the work of art, is especially acute with kinetic art, where a compromise between the two seems impossible: when engine parts stop working or light bulbs go out, the work will stop functioning unless replacement is performed. What options are available, and how will they impact the object and our understanding of it? Issues of technological obsolescence—and of the strong sociological and historical meanings embedded in a given technology and its use

by an artist—further complicate matters.

This two-day conference will examine the history of kinetic art and its preservation and explore the ethical and practical challenges of conserving and documenting kinetic works. For more information, contact Rachel Rivenc (rrivenc@getty.edu) or Lydia Beerkens (lydia.beerkens@planet.nl). INCCA is hosted by the Cultural Heritage Agency of the Netherlands.

Tribute



Laura Mora in Egypt's Tomb of Nefertari. Photo: Guillermo Aldana, for the GCI.

LAURA MORA (1923–2015)

Laura Mora, the famed and beloved Italian paintings conservator, passed away at the end of May in Rome. Active in conservation for over half a century, she and her husband Paolo Mora (who died in 1998) were major figures in the field, and their accomplishments included decades of work and teaching at Italy's Istituto Centrale per il Restauro and the authorship, along with Paul Philippot, of *Conservation of Wall Paintings*, a landmark work in conservation.

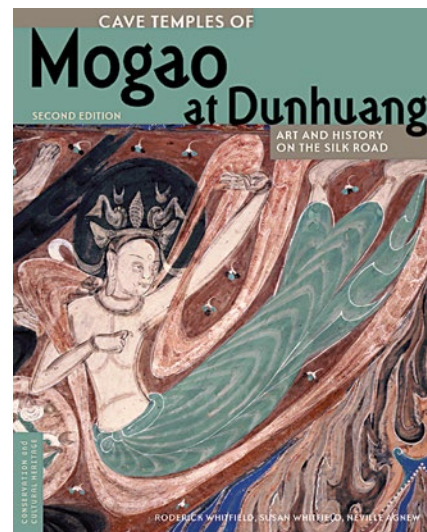
Laura and Paolo were collaborators on many conservation projects around the world, including the Getty Conservation Institute's very first field project, the conservation of the Tomb of Nefertari (1986–92), conducted in partnership with the Egyptian Antiquities Organization (today the Ministry of State for Antiquities). The Moras led the campaigns to conserve the tomb's wall paintings and, as part of the project, trained conservators from Egypt and other countries.

Teaching and training, in fact, constituted an essential part of Laura's and Paolo's lives in

conservation. In an interview with this publication back in 1991, Laura said, “Conservation was our destiny. In our early studies, we tried to establish a conservation program with a critical scientific approach. So we tried to construct and build slowly, first in our own experience, and then with others. We came to feel that we could transmit our experience to others in the field. Our mission, our passion, has been to do this, because it is through teaching that we confirm everything. We feel that we are not necessary anymore because a status has been created and there are young people in so many parts of the world who are our conservators. Thanks to them, we have understood things, and these are always things that come from the heart.”

Laura Mora, like her husband Paolo, will be sorely missed, but their legacy lives on through their many students and the heritage they conserved for future generations.

New Publications



Cave Temples of Mogao at Dunhuang: Art and History on the Silk Road

Second Edition

By Roderick Whitfield, Susan Whitfield, and Neville Agnew

The Mogao Grottoes in China, situated near the town of Dunhuang on the fabled Silk Road, constitute one of the world's most significant sites of Buddhist art. The hundreds of caves

The J. Paul Getty Trust

James Cuno, *President and Chief Executive Officer*

The Getty Conservation Institute

Timothy P. Whalen, *Director*

Jeanne Marie Teutonico, *Associate Director, Programs*

Kathleen Gaines, *Associate Director, Administration*

Kathleen Dardes, *Head of Collections*

Tom Learner, *Head of Science*

Susan Macdonald, *Head of Buildings and Sites*

Conservation Perspectives, The GCI Newsletter

Jeffrey Levin, *Editor*

Angela Escobar, *Assistant Editor*

Carol Hahn, *Production Assistant*

Picnic Design, *Design*

Color West Lithography Inc., *Lithography*

Conservation Perspectives, The GCI Newsletter is distributed free of charge twice a year to professionals in conservation and related fields and to members of the public concerned about conservation. Back issues of the newsletter, as well as additional information regarding the activities of the GCI, can be found in the Conservation section of the Getty's website, www.getty.edu/conservation/.

The Getty Conservation Institute works to advance conservation practice in the visual arts, broadly interpreted to include objects, collections, architecture, and sites. It serves the conservation community through scientific research, education and training, model field projects, and the broad dissemination of the results of both its own work and the work of others in the field. In all its endeavors, the Conservation Institute focuses on the creation and dissemination of knowledge that will benefit the professionals and organizations responsible for the conservation of the world's cultural heritage.

The GCI is a program of the J. Paul Getty Trust, a cultural and philanthropic institution dedicated to critical thinking in the presentation, conservation, and interpretation of the world's artistic legacy.



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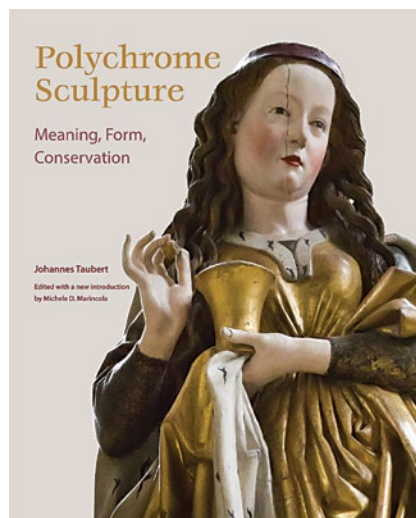


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carved into rock cliffs at the edge of the Gobi desert preserve a thousand years of exquisite art. Founded by Buddhist monks as an isolated monastery in the late fourth century, Mogao evolved into an artistic and spiritual mecca whose renown extended from the Chinese capital to the western kingdoms of the Silk Road. Among its treasures are miles of stunning wall paintings, more than two thousand statues, magnificent works on silk and paper, and thousands of ancient manuscripts, such as sutras, poems, and prayer sheets.

This new expanded edition, *Cave Temples of Mogao at Dunhuang* (first published in 2000), combines lavish color photographs of the caves and their art with the fascinating history of the Silk Road to create a vivid portrait of this remarkable site. Chapters narrate the development of Dunhuang and the Mogao cave temples, the iconography of the wall paintings, and the extraordinary story of the rare manuscripts—including the oldest printed book in existence, a ninth-century copy of the *Diamond Sutra*. The book also describes the collaboration between the Getty Conservation Institute and Chinese authorities in conservation projects at Mogao and the ways the site can be visited today.



Polychrome Sculpture: Meaning, Form, Conservation

By Johannes Taubert

Edited with a new introduction by

Michele D. Marincola

In the decades since its initial publication in Germany in 1978, *Polychrome Sculpture* has

come to be widely regarded as a watershed text on the making and meaning of European medieval and Baroque painted wood sculpture. An early proponent of interdisciplinary research, Johannes Taubert played a pioneering role in combining the rigorous scientific analysis of materials with a fuller understanding of form and function, an approach that has led to the development of technical art history as practiced today.

Many of the essays in this volume apply such scientific techniques as microscopic analysis to an art-historical understanding of Romanesque and late Gothic wood sculpture, revealing that, far from serving a merely decorative function, the painted surface of these works was intricately connected to their meaning. The paint layers on the sculptures, for example, which the author spent years documenting through close examination and analysis, were intended to impart a heightened sense of reality to the life-size sculptures, thereby enhancing the viewer's experience of worship. Taubert believed it was crucial for conservators to understand this context before undertaking any treatments. No other book offers such a focused, subtle, and interdisciplinary examination of the subject as *Polychrome Sculpture*.

This influential work is now available in English for the first time, in a meticulous translation enhanced and updated by new color illustrations, annotations to the original text, and a new introduction.

These publications can be ordered at shop.getty.edu.



CONSERVATION PERSPECTIVES

THE GCI NEWSLETTER



The GCI's offices in Marina del Rey, California, which the Institute occupied from 1985 to 1996. The GCI moved to the Getty Center in July 1996. Photo: Dingeman Kalis, for the GCI.



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