

Digital workflows for the conservation and sustainability of historic places

The documentation of historic places and landscapes plays a key role in the management of cultural heritage. Information obtained during documentation will guide the maintenance, monitoring and ongoing conservation of heritage places, support interventions and the rehabilitation of historic fabric and provide material for interpretation and dissemination to a wider audience. In extreme cases, where sites are undergoing radical change, have disappeared altogether or are inaccessible, documentation may serve as the only means through which a site can be understood.

The Comité International de la Photogrammétrie Architecturale (CIPA) was founded in 1968 to promote and support the important work of heritage documentation. Working alongside the International Society for Photogrammetry and Remote Sensing, CIPA facilitates the application of measurement technology to the disciplines of heritage documentation and recording. CIPA's mission is to encourage the development of principles and practices and the creation of specialized tools and techniques, for the recording, documentation and information management for all aspects of cultural heritage.

This special issue considers the development of digital workflows for the documentation and conservation of historic places. It was curated using a small selection of exemplary papers from those submitted to the 26th biennial CIPA symposium "Digital Workflows for Heritage Conservation", held from 28 August to 1 September 2017, in Ottawa, Canada.

The rapid rise in new digital technologies has revolutionized the practice of recording heritage places. Digital tools and media offer a myriad of new opportunities for collecting, analysing and disseminating information about heritage sites. With new opportunities, there are also conflicts and an intense effort is underway to incorporate digital media into the education of conservation professionals. Issues regarding the proper, innovative and research-focused uses of digital media in heritage conservation are urgent topics in the global heritage conservation field, and CIPA and its partners have played a leading role in this area of cross-disciplinary research and practice. The 26th CIPA symposium offered a unique opportunity for educators, professionals, heritage institutions and managers of heritage places to share, exchange and explore new approaches, best practices and research results.

The papers included in this special issue were selected for their focus on innovative approaches to digital documentation and information management in the context of heritage conservation. The goal is to provide the opportunity for professionals working with heritage places – educators, practitioners, owners, property managers and others – to learn from the experiences of those who are actively using digital workflows to study, protect, maintain, conserve and interpret heritage sites. All papers were originally submitted for presentation at the 2017 CIPA symposium and have been updated and revised for publication. The authors are affiliated for the most part with government agencies and academic institutions.

Elizabeth Shotton's paper "Living in the clouds: conceptual reconstructions of harbour structures" proposes a novel approach to the documentation of minor harbour structures along Ireland's coastline, imperative to understanding the evolution of maritime engineering in Ireland. Both the threat of rising sea levels and ongoing deterioration of these features bring an urgency to this work. Combining terrestrial LiDAR scans with historical research in the pilot study, the researchers were able to capture the evolution of the harbours and document their eccentric forms and integrated topography in a way that had not been possible with conventional survey methods.



The Turner article “Rock art CARE: a cross platform mobile application for crowdsourcing heritage conservation data for the safeguarding of open-air rock art”, describes an app developed by researchers at Newcastle University and Queen’s University Belfast. The innovative app enables mobile device users to report on the condition of Neolithic and Early Bronze Age rock art carvings in the UK and Ireland, as well as taking specific measurements of the site. This crowdsourcing approach provides valuable information to researchers and encourages users to feel that they are contributing to the conservation of cultural heritage.

John Arnold’s paper describes how researchers integrated a high-resolution, big-data, historical geographic information system with Esri’s CityEngine procedural modelling software to create a pair of historic 3D digital landscapes. Using the nationally significant copper mining region of Michigan’s Keweenaw Peninsula as a case study, these models were used to compare the industrial landscapes of 1917 and 1949 and support the heritage management and public education goals of both the community and the Keweenaw National Historical Park. The researchers found that the Esri software, while not designed for this application, was sufficiently robust and flexible to perform well. The paper outlines the potential opportunities and challenges offered by this approach and discusses the potential for digital conservation where physical conservation is not feasible.

Thomas Kersten’s paper “The historic wooden model of Solomon’s Temple – 3D recording, modelling and immersive virtual reality visualisation” describes the workflow involved in the creation of a virtual 3D model of a seventeenth century wooden model. The wooden model, located at the Hamburg Museum, depicts Solomon’s Temple, a structure erected on the Temple Mount of Jerusalem in the tenth century BCE and destroyed in the sixth century BCE. The paper outlines the considerations involved in creating a 3D model in two game engines – Unity and Unreal – and explores the benefits of virtual reality applications for heritage conservation.

The McGibbon paper “Towards a digitized process-wheel for historic building repair and maintenance projects in Scotland” proposes a more efficient approach to project management of historic building repair and maintenance, using digital tools to support Integrated Project Delivery. Using a site on the West coast of Scotland as a case study, the researchers applied a digital “process-wheel” to provide a structured and standardized approach for data capture and sharing, as well as applying digital technologies to attain efficiencies during the project.

The Prizeman paper “How can century-old architectural hierarchies for the design of public libraries be re-interpreted and re-used?” outlines a novel approach to the conservation of heritage sites using the large inventory of extant Carnegie Library buildings that were built to standard plans during the late nineteenth and early twentieth centuries. By identifying and scanning standardized and common elements of Carnegie Library buildings, the researchers propose to create a digital catalogue of historic building elements specific to this building type. The catalogue could then be used in the context of building information modelling (BIM) software to support the conservation of this large inventory of library buildings. The researchers outline the preliminary work undertaken to discern the advantages and challenges of this approach.

In the final paper in this issue, “Level of detail, information and accuracy in building information modelling of existing and heritage buildings”, a research team from Carleton Immersive Media Studio (CIMS) details the creation of a set of benchmarks to provide guidance for using BIM in the context of heritage conservation. Taking into account the unique requirements of existing and heritage buildings, the proposed BIM guideline was developed by the CIMS team in the course of its modelling work on Parliament Hill National Historic Site in Ottawa, Canada.

JCHMSD
8,4

We trust you will enjoy these contributions and that they will elicit further exploration of the potential role that digital technologies can play in the documentation and conservation of cultural heritage sites.

Laurie Smith

Carleton Immersive Media Studio, Carleton University, Ottawa, Canada, and

Mario Santana Quintero

404

*Department of Civil and Environmental Engineering, Carleton University, Ottawa, Canada,
and Raymond Lemaire International Centre of Conservation,
Katholieke Universiteit Leuven, Leuven, Belgium*