

Engineering and materials science solutions for the conservation of cultural heritage

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Abstract — Conservators and curators in museums and other cultural heritage institutes are responsible for the conservation, preservation, and restoration of aging objects, for example, archaeology, art, historic buildings, or industrial heritage. As in industry, the term aging is used in the broadest sense of the word, and can include environmental effects, chemical changes, and mechanical damage. However, unlike industrial and consumer products, historical objects and objects of art are, more often than not, unique. Decisions on display or storage conditions, and/or restoration treatments (if any) must therefore be made based on non-destructive and, often, subjective examination of the objects. So-called “conservation ethics” play an important role in such decisions. Furthermore, the uniqueness, as well as in many cases, the extreme age of the objects means that conservators are much more dependent than their industrial colleagues on materials simulations and life prediction models for understanding an object’s past, and predicting its aging behaviour in the future. This talk will look at the application of materials science and engineering methods for dealing with critical issues in conservation of objects of cultural heritage.

Bio — Dr. W. (Bill) Wei has a Bachelor of Science in Engineering degree from Princeton University, USA, and a Ph.D. in Materials Science from the University of Illinois Urbana-Champaign, USA. Before working in the cultural heritage world, he worked on the development of modern materials solutions for the aircraft and power industries, including the Max-Planck-Institut für Eisenforschung, Düsseldorf, and Motoren-und-Turbinen-Union GmbH, München. His expertise in industry includes corrosion, failure analysis, and the mechanical properties of materials. In 1998 he joined the Netherlands Institute for Cultural Heritage, now part of the Cultural Heritage Agency of the Netherlands. He conducts research into the effects of cleaning and treatments of objects on their appearance, including: the use of non-contact roughness measurements to study surface changes; the effect of aging and cleaning on the surface and appearance of face-mounted and other photographs, daguerreotypes, metal objects, paints, and outdoor sculpture; and the effect of vibrations and mechanical stresses on the condition of fragile works of art. He also teaches specialized courses in his research areas for, among others, the conservation training program at the University of Amsterdam, and the University of Applied Sciences in Berlin.