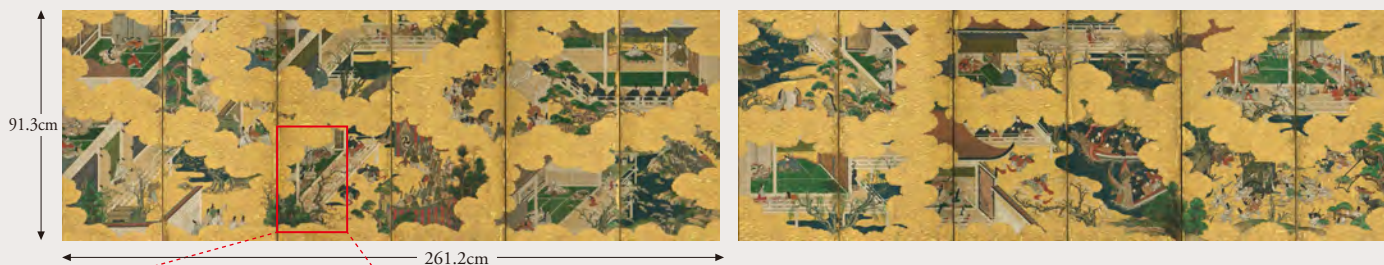


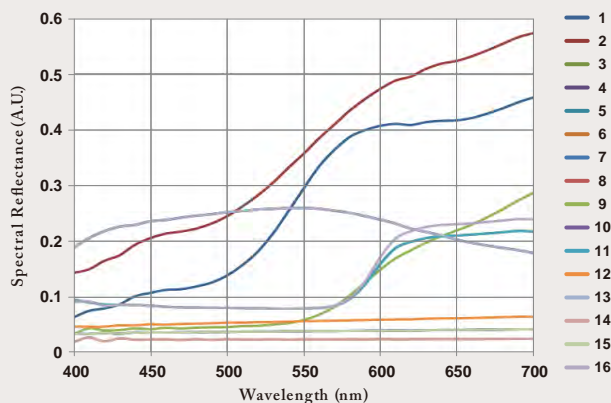
Cover Story

Scientific Recording of Cultural Heritage Assets



40 X 26cm

Located in Kyoto, a city of culture, art, and technology, the Ide Laboratory of the Graduate School of Engineering has developed state-of-the-art imaging technologies to scientifically record numerous cultural heritage artifacts in Kyoto and around the globe. Our high-precision imaging system for cultural assets digitizes large artworks such as Japanese screens (*byōbu*), wall paintings, precious old design maps of important historical buildings, and world heritage industrial design plans. It is distinct in its high dimensional and color reproduction accuracy, being one order of magnitude higher than commercial imaging systems. The digitization process has been carefully designed to minimize intrusive effects by developing appropriate light sources. We have also been successful in adding analytical imaging features, which enables non-destructive and non-invasive analysis of material composition and color.



Pigment Analysis

Using analytical imaging, it is possible to extract material information from the images scanned by the high resolution scanning system at the single pixel level (a few microns). Spectral information is estimated using a calculation model that was created by the laboratory members. Sixteen distinct points represent different pigments used in the large folding screen (*byōbu*). The spectral reflectance curves of those points were reconstructed and compared to those of a database of Japanese pigments. Since spectral reflectance is a material property, it is possible to estimate the material used in creating the respective colors found on the screens. This approach is a non-invasive and non-destructive way to analyze precious cultural heritage artifacts.

The image on the front of this booklet is a detail from the paintings on a pair of *byōbu* in the Sumitomo collection, which is housed in the Sen-oku Hakuko Kan museum in Kyoto. It is estimated that the screens were painted in the middle of the 17th century. The remarkably well-preserved golden paintings are not only beautiful, but are a valuable source of historical data about the pigments used in paintings, as well as the lifestyles of the people in the era depicted. The images on the screens are of scenes from *The Tale of Genji*, one of the world's first novels and a masterpiece of Japanese literature. The novel was written by Murasaki Shikibu in the early 11th century, the cultural peak of the Heian period, and depicts the lifestyles of the nobility at that time. It is a rich source of information about the lives and culture that later drove the visual arts (paintings) and new styles of storytelling in Japanese society, deeply influencing modern literature. Other classical paintings from early periods also exist, but these images from the golden *byōbu* are of particular interest in that the scenes depicted show the lifestyle of the nobility and the common people coming closer during an important transition period for Japanese society in the early Edo era.

In 2015 the Ide Laboratory collaborated with several national and international institutes to scientifically record important cultural heritage artifacts. Working in China, Myanmar, the US, Iran, and throughout Japan, we digitized cultural heritage assets on-site and recorded them in microscopic detail. The knowledge gained about pigments and colorants from the projects in Japan and China are expected to greatly enhance our understanding of the art and technology of the early Edo period. During the past decade, the Ide Laboratory has carried out projects in China (Xian, Beijing, Hong Kong, Inner Mongolia), the UK (Belfast, London), Spain (Madrid), Italy (Padova, Torino), Korea (Seoul, Pusan), Egypt (Cairo, Giza), the Philippines (Manila), Myanmar (Yangon, Bagan), the USA (New York, Boston, Philadelphia), as well as at over fifty sites in Japan. Through this work, the laboratory seeks to establish a global network for collaboration to preserve and utilize the world's cultural resources, and pass them down to the next generation. We hope that this technology, developed in Kyoto, will serve as a catalyst to encourage renewed global discussion and interest in cultural heritage.