

**Advanced High Resolution Imaging Technology
for Conservation of Important artifacts in Libraries and Archives**

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Speaker's bios & abstract

Country	Japan	
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BIO

Ari Ide-Ektessabi studied in Faculty of Electronics Engineering, Kyoto University, Japan during 1973-1983, and obtained his PhD in electronics engineering. His field of research was designing systems of charged particle beams for fabrication and analysis of surfaces and materials. He joined Kyoto University as an associate professor in 1991 and as a professor from 2001. He was the leader of **six major projects** related to the application of advanced technology in ***Advanced High Resolution Imaging Technology for Conservation of Important artifacts in Libraries and Archives*** as follows:

- **Development of High-resolution Large Flatbed Scanner for Digitizing Large Artworks and Non-Destructive Pigment Estimation**
Japan Science and Technology Agency, Comprehensive Support Program for Creation of Regional Innovation: Key Seed Projects for Regional R&D, FY 2004-2007
- **An Integrated System for Secure and Dynamic Display of Cultural Heritage**
Japan Science and Technology Agency, Comprehensive Support Program for Creation of Regional Innovation: Regional R&D Resources Utilization, FY 2006-2008
- **Developing the Technical Foundation for International Digital Museum,**
The Feasibility Study Program 2009, Ministry of Education, Culture, Sports, Science and Technology (MEXT), Realization of the System and Basic Technical Elements of Digital Museum
- **International Joint Research on High Resolution Digitization of Asian World Heritage**
Japan Special Coordination Funds for Promotion of Science and Technology, Asia-Africa Science and Technology Strategic Cooperation Promotion Program, FY 2009-2011
- **Program for Education of Man Power in the Field of Documentation and utilization of Asian (China) World Heritage**
- **Program for Education of Man Power in the Field of Documentation and Utilization of Philippines Tangible and Intangible Heritage**
Official Development Assistance Grants for UNESCO Activities, the Ministry of Education,

Culture, Science and Technology (MEXT) , 2010-2012. (A program dedicated to support the collaboration and exchanges in Asian-Pacific area, for development of Education, Science, and Culture.)

He published more than 250 papers in material processing, analytical techniques using accelerators, charged particle beams and synchrotron radiation and a book on application of synchrotron radiation (Springer 2007).

ABSTRACT

The aims of our research and development activities are to support librarians and museum experts to use state-of-the-art technology for conserving and recording Asian (Japanese, Chinese, and Korean) old documents on paper. From 2004, projects sponsored by the Ministry of Education, Culture, Science and Technology (MEXT) and other Japanese government and private organization, were organized and lead by the Graduate School of Engineering, Kyoto University

At present, many of the world's important cultural heritage assets are under continuous threat of being extensively destroyed by wars, poverty, ignorance and natural disasters. This is driving the entire relevant national, regional, and international cultural heritage agencies to be more determined in scientifically recording and preserving these human assets.

During more than 20 international and domestic conferences and educational workshops that were organized by our group, we recognized some wide and still evolving interests in conservation and protection of cultural heritage among museums researchers, librarians and universities.

In my talk I will give a detailed introduction to the imaging techniques that were developed, which are fast and practical for digitizing large objects at high to ultrahigh resolution. The techniques are summarized as follows:

- High to ultrahigh resolution trichromatic scanning with color difference of about 1.0-1.5 (the commercial cameras are 5-9 or worse)
- Near infrared scanning (780-1000nm).
- Monochromatic multi(hyper) spectral imaging (8 bands or more)
- Trichromatic multi (hyper) spectral imaging (15 bands or more)
- High resolution polarized light scanning for metallic and shiny surfaces
- Transmission light (and reflection light) scanning
- 3Dshape and color reconstruction using a 5-axis (5 degrees of freedom) scanner

Up until the end of 2014, more than 70 systems were already developed and are being used in Japan, Europe, Asia and Africa on cultural heritage sites and museums, which include users from more than 50universities, museums, and broadcasting organization. The large-sized cultural heritages that were documented by these technologies include a wide range of Japanese, Chinese, Egyptian, Korean and European objects.

Some of the projects that have been successfully completed recently are:

1. The mural paints of Tang Dynasty in China
2. Heritage assets in Palace Museum in Beijing
3. UNESCO world Heritage, Kannondo, Ninnaji Temple
4. Paliotto by Pietro Pifetti in Torino
5. Collection Design Plans of Titanic in UK
6. Joint project with V&A museum to digitize an important collection in UK, and Spain.

To date, we have already digitized more than 8000 large objects at high to ultra-high resolutions, probably the world's biggest digital collection of large objects.