

Science and Technology Group Annual Report FY2017

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1 Introduction

The goal of the Art Conservation Program at OIST is to contribute to the preservation and understanding of Okinawan material culture through collaborations with local cultural institutions such as the Yuntanza Museum (formerly called the Yomitan Museum of History & Folklore) and the Naha Municipal Tsuboya Pottery Museum. Collaborative work with other OIST research units as well as with conservation professionals from abroad is ongoing. In FY17 our work largely consisted of performing conservation treatments to preserve cultural artifacts, research into newly discovered clay sources that were suspected to have been used by historic Kina potters, and the establishment and implementation of Reflectance Transformation Imaging protocols.

2 Activities and Findings

Conservation Treatments of Yuntanza Museum Artifacts

- *Mishibaachi* (special occasion red & black lacquer bowl), Okinawan, Acc.#763: Treatment involved the humidification and consolidation of unstable areas of lifting lacquer. X-ray Fluorescence (XRF) and cross-section analysis were performed to further our understanding of the object.
- Ceramic Jar, Okinawan, 12th-16th century, No Acc# (OIST 167): This jar was excavated from the *Ufugushiku* archaeological site in Yomitan. It was brought to OIST in pieces (Fig. 1). Treatment in FY17 included reduction of the thick calcium carbonate burial accretion using both mechanical methods and a weak acid solution, desalination, and reconstruction of the vessel using archival adhesive (Fig. 2). Further treatment steps are ongoing.



Fig. 1: *Ufugushiku* Ceramic Jar, Owner: Yuntanza Museum, before treatment



Fig. 2: *Ufugushiku* Ceramic Jar, Owner: Yuntanza Museum, during treatment

- *Kufan* (ceremonial red & black lacquer lidded vessel) Okinawan, Pre WWII, Acc#1513: Treatment in FY17 involved humidification and consolidation of certain areas of unstable, delaminating lacquer. XRF and cross-section analysis were performed to improve our understanding of the artifact. Further treatment steps are ongoing.

Kina Clay Analysis

- A project was completed to analyze clay samples that were recently discovered in the Kina area of Yomitan. This project was a collaboration with the Yuntanza Museum. Archaeologists suspected that these newly found clays may have been the same sources used by historic Kina potters. To test this theory, we compared fired samples of these new clays to archaeological Kina-yaki potsherds. Samples from four different clay locations were formed and fired by seven different local pottery workshops, each under different firing conditions. The samples were examined under magnification and analyzed using XRF and X-ray Diffraction. Although generally similar to Kina-yaki, the new samples still exhibited key disparities such as: low quartz content and differences in certain elemental ratios. In conclusion, none of the new samples could be positively identified as being from the original Kina-yaki clay sources.

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Reflectance Transformation Imaging (RTI)

- RTI is a photographic method that captures a subject's surface shape and color. It allows for interactive, virtual relighting of an artifact on a computer.¹ RTI helps highlight artifact condition issues or can enhance inscriptions. A specialized RTI protocol was developed by visiting conservator Kristen Gillette. Yuntanza Museum artifacts were imaged including: *Kufan* #1513, Red Lacquer Bento Box #3120, Black Lacquer *Juubako* (No Acc#), an archaeological Chinese coin, and an engraved stone (*Senkokusekiban*) from Zakimi castle (Fig. 3). Due to RTI imaging, the coin was identified as a particular type of Qing dynasty coin dating to 1644. The engraved stone was able to be read more clearly, enhancing its understanding, and an RTI image of it was put on display in the museum.



Fig. 3: Reflectance Transformation Image, Engraved stone (*Senkokusekiban*) from Zakimi Castle, Owner: Yuntanza Museum

3 Collaborations & Visitors to the Art Conservation Program

- **Tessa Young**, Pre-program Intern. Oct 2 – Dec 10, 2017. Ms. Young's activities included the conservation treatment and study of Okinawan artifacts. She also assisted with ceramic analysis.
- **Kristen Gillette**, Visiting Conservator. Nov 6, 2017 – Jan 12, 2018. OIST Seminar on Dec 6, 2017 titled "Raking Light: An introduction to Reflectance Transformation Imaging (RTI) and its uses in the context of cultural heritage." Ms. Gillette developed and tested RTI protocols for the Art Conservation Program. She has made critical and lasting contributions the Program and to the Yuntanza Museum. She also participated in the conservation treatments of the *Ufugushiku* Ceramic Jar and the *Kufan*.

4 Publications and other output

- Spence, S., Harada, T., Margiolakis, A., Deckoff-Jones, S., Shugar, A., Hamm, J., Dani, K., and Dani, A. (2017). *Applicability of Femtosecond Lasers in the Cross-section Sampling of Works of Art*. MRS Advances, 1-4 (2017).
- Harada, T., Spence, S., Margiolakis, A., Deckoff-Jones, S., Ploeger, R., Shugar, A., Hamm, J., Dani, K., and Dani, A. *Obtaining cross-sections of paint layers in cultural artifacts using femtosecond pulsed lasers*, Materials 10, 107 (2017).

Art Conservation Treatment Proposals & Final Reports

- Young, T. "Ceramic Bowl: Artifact Exam & Trmt Proposal", Blue Glaze #12, Tsuboya Museum, 2017.
- Young, T. "Ceramic Vessel: Artifact Exam & Trmt Proposal", Ceramic Analysis #5 & 7, Tsuboya Museum, 2017.
- Young, T. Small Ceramic Jar: Artifact Exam & Trmt Proposal", Blue Glaze #9, Tsuboya Museum, 2017.
- Young, T. "Mishibaachi: Artifact Exam & Trmt Proposal", Acc.#763, Yuntanza Museum, 2017.
- Young, T. "Porcelain Bottle: Artifact Exam & Trmt Proposal", #2, Taro Kuranari, 2017.
- Young, T. "Unglazed Ceramic Bottle: Artifact Exam & Trmt Proposal", # 1, Taro Kuranari, 2017.
- Young, T. "Unglazed Ceramic Bottle: Final Trmt Report", #1, Taro Kuranari, 2017.
- Gillette, K. "Kufan: Artifact Exam & Trmt Proposal, Acc. #1513, Yuntanza Museum, 2017.

¹ Cultural Heritage Imaging. <http://culturalheritageimaging.org/Technologies/RTI/> Accessed July 31, 2018.