MCI Weekly Highlight – 21 May 2010

Research at MCI over the past 30 years has established the Smithsonian’s Museum Conservation Institute (MCI) as one of the leading centers in the world for studies related to the technology, provenance, and conservation of archaeological and historical materials. This research area relies heavily on advanced analytical instrumentation and imaging techniques in order to address archaeological questions and conservation issues. Important analytical techniques include stable isotope mass spectrometry, laser ablation-inductively coupled plasma-mass spectrometry, X-ray fluorescence spectrometry, electron microscopy, X-ray diffraction, and 3D imaging, which — among others — are all available in MCI’s state-of-the-art analytical laboratories. Research focused on archaeological materials fits into the larger Smithsonian theme of Valuing World Cultures.

MCI’s archaeological research group includes Jeff Speakman (Head of Technical Studies/Archaeologist) with expertise in inorganic studies of archaeological ceramics and pottery; Harriet F. (Rae) Beaubien (Head of Conservation/Conservator) with expertise in the technical study and conservation of inorganic and organic archaeological objects with an emphasis on on-site conservation; Nicole Little (Physical Scientist/Archaeologist) with expertise in chemical and mineralogical studies of inorganic archaeological materials; and Christine France (Physical Scientist/Isotope Geochemist) with expertise in stable isotope characterization of organic and inorganic materials, diagenetic alteration of archaeological and paleontological specimens; and late Pleistocene/early Holocene archaeology and paleontology. Melvin Wachowiak (Senior Conservator) provides expertise in a variety of imaging techniques including light microcopies, 3D scanning, extended focal imaging, replication of objects, and advanced object documentation.

- **Recent symposia.** Jeff Speakman (MCI), Javier Iñañez (MCI) and Christopher Wolff (NMNH & MCI) organized two sessions at the 75th Annual Meeting of the Society for American Archaeology, St. Louis held April 14–18, 2010. The sessions titled Archaeological Science 2010: Part I & II included 32 presentations by archeological scientists from across the United States. MCI research was prominently represented at the 38th International Symposium on Archaeometry, held at the University of South Florida, Tampa, May 10–14, 2010, where 9 papers and posters were presented based on research undertaken at MCI.

- **Panamanian excavation featured in National Geographic.** Rae Beaubien (MCI) is working with a STRI archaeological team in the excavation of a Pre-Columbian mortuary site, El Caño, a project that will be featured in an upcoming issue of National Geographic. The excavation has recovered numerous gold and related metal artifacts. This supports a broad study of goldworking in Pre-Columbian Panama conducted by Rae and two fellows in collaboration with archaeological colleagues at STRI. Detailed information on composition and fabrication is being compiled on gold artifacts in the collections of NMAI, NMNH, and the Museo Antropológico Reina Torres de Araúz, the national museum located in Panama City, as well as recently excavated finds from several sites in Panama, such as El Caño, curated at STRI. This dataset will be used to test hypotheses about the origins and development of goldworking technology in the Americas.

- **Dating volcanic eruptions with tree rings.** MCI researchers Christine France and Jeff Speakman, in collaboration with the University of Arizona, are looking for isotopic signatures for volcanic eruptions in tree rings. The annual growth rings obtained from well dated *Pinus michoacana* tree ring cores from Paricutin, Mexico show chemical signatures that correlate with a known local volcanic eruption (1943-1952) and its subsequent atmospheric and terrestrial inputs. This novel analytical approach can potentially be used to date unknown eruptions which in the past have often relied on the common dendrochronological technique of tree ring width
determination, or on historic human records. Results of this study were reported at several recent national and international meetings.

- **Obsidian tools trace the peopling of the Americas.** Jeff Speakman (MCI) and Nicole Little’s (MCI) ongoing research, conducted at MCI in partnership with Dennis Stanford (NMNH), the National Park Service, University of Alaska Museum of the North, University of Washington, University of Missouri, and many Russian colleagues, is using unique trace elements in obsidian archaeological artifacts, such as arrow points, to find their volcanic source. The study has focused on archaeological sites and volcanoes in three geographic regions—the Kurile Islands, the Kamchatka Peninsula, and Alaska, and show that some artifacts from archaeological sites in Alaska originate from volcanic sources in northeast Russia. The primary objectives of this research include: (1) to study prehistoric inter- and intra-regional patterns of mobility, trade, exchange, resource exploitation, and cultural interaction; (2) to facilitate a better understanding of the prehistory of Eastern and Western Beringia; and (3) to foster collaborations between U.S. and Russian colleagues that will facilitate the exchange of ideas and research findings. To date chemical data have been generated thus far for more than 10,000 obsidian artifacts and geological source samples and have resulted in 1 NSF grant submission, 4 peer reviewed publications, and about 10 professional presentations in the past year.

- **Artifacts of American colonial history.** MCI researchers are collaborating with archaeologists from the Jamestown Rediscovery Team and Doug Owsley (NMNH), on a number of projects related to ongoing excavations at America’s first permanent English settlement in the New World. MCI projects include the high resolution imaging of a Jamestown slate object that is covered with words, numbers, and etchings of people, plants, and birds that its owner likely encountered in the New World in the early 1600s. Additional research is underway to determine the geologic origin of the slate which is presumed to have been quarried in England. MCI also is collaborating on a project to determine the origin of Spanish majolica pottery recovered from recent excavations at the site. Finally MCI has recently completed the chemical analyses of human bone from ca. 60 individuals to better understand the health and status of these early settlers.
2010 ARCHAEOLOGICAL SCIENCE PRESENTATIONS BY MCI STAFF AND FELLOWS


