

EXPLORING NORTH CAROLINA'S ARCHAEOLOGICAL HERITAGE THROUGH REMOTE SENSING AND GEOPHYSICS

March 12, 2016

North Carolina Museum of History, Raleigh, North Carolina

The North Carolina Office of State Archaeology in association with the North Carolina Museum of History, and the United States Forest Service, is hosting a public presentation to discuss the application and relevance of using Remote Sensing to explore North Carolina's buried history. The last several years have witnessed an increase in the use of geophysical remote sensing as "non-invasive" methods to recover data that in the past were unavailable to archaeologists. The presentations will discuss how the application of ground penetrating radar (GPR), magnetometers, and metal detecting are used to locate and map subsurface natural and cultural features. Several archaeological sites in North Carolina are discussed in detail using information obtained from the application of these methodologies. These methods and techniques represent a new frontier in archaeological research.

The presentation will be held at the North Carolina Museum of History from 9:00 am-2:00 pm. Admission is free and open to the public

For e-mail notification of updates, or with any questions, please contact John J. Mintz at 919-807-6555, or john.mintz@ncdcr.gov with the North Carolina Office of State Archaeology.

9:00-9:10am

Welcome and Introductions

John J. Mintz, Lea Abbott (North Carolina Office of State Archaeology), and Shawn Patch, (New South Associates, Inc.)

9:10-9:35am

The Role of GPR in Archaeology: A Beginning Not an End

Charles Ewen, Department of Anthropology, East Carolina University, Greenville
The general public, via such television programs as CSI and Bones, think they know all about the amazing detecting capabilities of ground-penetrating radar (GPR). However, real archaeologists know better. Or do they? GPR is the first step in reconnaissance archaeology and requires follow up ground-truthing. This paper examines the use and effectiveness of GPR as employed by East Carolina University archaeologists.

9:35-10:00am

3D Remote Sensing and Modeling of the House in the Horseshoe State Historic Site

Stacey Curry and Doug Gallaway, Department of Geography UNC, Greensboro
The House in The Horseshoe (Alston House), located in Sanford NC, is an 18th century property with a complex history of land use. This site was the scene of much smaller skirmish between North Carolinians loyal to the British crown and those in favor of independence. Using digital camera photogrammetric methods to capture the Alston House at the House in the Horseshoe State Historic Site, a point cloud was generated used to model the house and

surroundings. The House in the Horseshoe provides an opportunity to test the hypothesis that using SLR digital camera to capture multiple photos of the Alston House can provide an accurate point cloud. In order to test this multiple photos have to be taken of the house from multiple angles. Through applying photogrammetric principles using target or control points located throughout the photos to create the point cloud, the resulting cloud can then be tested against total station survey points and an accuracy assessment executed. This method provides not only accuracy assessment, but a comprehensive point cloud of structure.

A comprehensive evaluation of various modeling and point cloud generation tools is also presented. Such software tools include, SFM, Photoscan, CloudCompare, and Autodesk 123D Catch. A concluding discussion of the next steps and hints to data fusion with other remotely sensed datasets are included in the paper.

10:00-10:05am BREAK

10:05-10:30am

Geophysical Investigations of Prehistoric and Historic Sites in North Carolina

Jacob Turner and Ari Lukas, Department of Geology, University of North Carolina at Greensboro

This presentation reviews the results of two geophysical surveys. The first was conducted by UNCG in conjunction with TRC Environmental for NC DOT as a part of data recovery efforts (Middle to Late Qualla) at McCoy Bridge in Macon County. The second series of surveys were at House in the Horseshoe, a state managed historic site associated with the American Revolution in Moore County. These works provided a wealth of interpretive challenges that are common to geophysical surveys, the opportunity to image different types of features that are likely to appear on historic and prehistoric sites within Ground Penetrating Radar (GPR), magnetic gradiometer, conductivity and magnetic susceptibility survey maps. These projects also provided opportunities for collaboration between UNCG and the State Office of Archaeology, North Carolina Historic Sites Division, and a private CRM firm, TRC Environmental.

10:30-10:55am

Greater than the Sum of its Parts: Archaeological Geophysics and Ground-Truthing in Western North Carolina

Alice P. Wright and Tim Horsely, Department of Anthropology, Appalachian State University, Boone

Over the past several decades, archaeological research across western North Carolina has revealed deep and dynamic Native American histories. In particular, large-scale excavations associated with the University of North Carolina's Cherokee Project as well as more recent cultural resource management projects have produced a baseline archaeological understanding of ancestral Cherokee lifeways in the Appalachian Summit. The application of geophysical methods to the archaeological record of western North Carolina stands to dramatically improve this understanding. In this talk, we show how a combination of traditional archaeological field methods and multiple geophysical prospection techniques are "greater than the sum of their parts," enabling us to ask and answer new questions about well-known sites while preserving vast portions of the archaeological record for future generations. Recent findings from the 2000-year-old Garden Creek site in Haywood County demonstrate the potential of these complementary techniques, and highlight the desirability of collaboration between archaeological geophysicists and excavators.

10:55-11:20am

Integrating Archaeological Geophysics into Cultural Resource Management: Potentials, Pitfalls, and Best Practices

Tim Horsley, Horsley Archaeological Prospection, LLC; Department of Anthropology, Northern Illinois University, DeKalb, IL

As their full potential in both commercial and research-driven archaeological investigations is being recognized, geophysical methods are at last finding a foothold in North American archaeology. When applied appropriately, these techniques can dramatically enhance our understanding and interpretations of archaeological sites; however, as they become more commonly requested on commercial projects, this raises a number of important questions: (i) What techniques and methodologies are “appropriate” for a given site? (ii) Who defines the methodology for a project, (the State Archaeologist/State Historic Preservation Officer; the client; the archaeological geophysicist; or someone else?) And (iii), how are the results reviewed, if at all? This paper will present results from North Carolina and beyond that illustrate some of the different ways these techniques can be used to improve how we do archaeology more effectively and efficiently.

11:20am -12:00pm LUNCH

12:00-12:25pm

Geophysical Applications in North Carolina Cemeteries

Sara Lowry, New South Associates Inc., Greensboro

This presentation will include case studies from several cemeteries in North Carolina. Emphasis is on common issues such as identifying unmarked graves and defining boundaries in a non-invasive manner.

12:25-12:50pm

Metal Detecting: The Down-to-Earth Tool of Remote Sensing

Linda Stine, Department of Anthropology, UNC Greensboro

UNCG archaeological research at the Troublesome Creek Ironworks and Guilford Courthouse national Military Park was enhanced through collaboration with a local metal detecting group. Metal detecting machines have been used to define site boundaries or military features at some historic sites since at least the mid-20th century. Though easy to initially learn, they are difficult to master. Four threads of discussion have been circulations in the past few years in historical archaeology about the use of this form of remote sensing: archaeologists should aspire to master the machines through RPA sanctioned workshops; archaeologists should teach one another the art and science of archaeology and detecting; archaeologists should teach themselves how to use the machine; or, that no archaeologists should have to use a metal detector in the 21st century. These debates affect potential future guidelines for academic-and CRM- driven archaeology in the state and region.

12:50-1:00pm BREAK

1:00- 1:25pm

Geophysical Survey of Large Mississippian Villages

Shawn Patch New South Associates Inc., Greensboro

This presentation will discuss the geophysical survey results from several large, complex Mississippian village sites in East Tennessee. It will focus on how these methods can be used to

identify internal site structure and feature patterning, as well as providing primary data to assist with National Register of Historic Places evaluations.

1:30-2:00pm

Discussion

Roy Stine, Department of Geography UNC, Greensboro