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Making a Point!

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Abstract/Objective

The archaeological field has been trying to become more collaborative and socially engaged with the public and researchers for many years. The latest attempt is the creation of "intangible digital models from tangible artifacts" (Means, McCuistion, and Bowles 2013: 1). The Virtual Curation Laboratory of Virginia Commonwealth University has made great efforts over the past few years on digitally curating and conserving "objects from historical sites using a NextEngine Desktop 3D Scanner" (Means, McCuistion, and Bowles 2013: 1). Besides making digital models of artifacts, the VCL can also make plastic replicas by using a MakerBot Replicator (Means et al. 2013). The VCL wishes to "extend conservation and access to collections" while enhancing the preservation and accessibility of said collections (Means, McCuistion, and Bowles 2013: 1). One of the collections that the VCL has consists of chipped stone artifacts, with projectile points being one of them. My objective is to make a point of emphasizing the importance of digitally archiving the archaeological record while using projectile points scanned by the VCL as an example of how the VCL accomplishes this.

VCL Logo (Means 2014)

Background

Beginning of the Virtual Curation Laboratory.

The Virtual Curation Laboratory, headed by Dr. Bernard K. Means, is a lab located in the School of World Studies at Virginia Commonwealth University. They started using 3D scanning technology "as a part of a project funded by the Department of Defense (DoD) Legacy Resources Management Program" and were "sponsored by the U.S. Marine Corps" (Means, McCuistion, and Bowles 2013: 1). They were to test the technology's effectiveness and demonstrate its usefulness "for potential employment in ensuring DoD compliance and historic preservation laws" (Means, McCuistion, and Bowles 2013: 1).

What are Chipped Stone Artifacts and Projectile Points?

Chipped stone artifacts are stone artifacts found at archaeological sites that have gone through a lithic reduction process (Hofman 1981). The most well known chipped stone artifacts are projectile points. "Projectile point" is a generic term used by many since differentiating "between arrow points and dart points" can be hard (Arkush and Sutton 2009: 52). Points can be made out of flint, chert, obsidian, quartz, or other kinds of rock (Justice 1987). They can allow one to organize what is left of extinct cultures, "follow the path of developments, and see significant changes over time" (Justice 1987: 1).

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Methods and Projectile Points

Scanning to Printing

The NextEngine Desktop 3D Scanner scans the points with lasers "specifically designed to record topological (surface) attributes" (Means, McCuistion, and Bowles 2013: 6). For points, you may face problems due to the thin edges or refractive properties since some are "manufactured from quartz or quartzite", which can be reflective (Means et al. 2013). This can generally be fixed by using baby powder (Means et al. 2013: 31). A software called ScanStudio is used to do things like editing and aligning. You can then make STL (stereolithography) files of the artifacts for digital use (Means, McCuistion, and Bowles 2013). Then, the STL file can be formatted into other files (Means et al. 2013). One file format is with Adobe Acrobat Reader which allows a person to "rotate, manipulate, and measure the digital model" (Means et al. 2013: 52). When printing points, the VCL uses a MakerBot Replicator. This uses another file format made from the STL file format and allows for the printing of plastic replicas of any size (Means et al. 2013).

Timeline

The timeline of projectile points fluctuates depending on the region but the one the VCL uses is very similar to the one used in the Northeast of the U.S.: Paleo-Indian Period (12,000-8,000 B.C.), Archaic Period (7,900-1,600), Terminal Archaic Period (1,800-1,000 B.C.) and Woodland Period (1,000 B.C. to 1,500 A.D.) (Fogelman 1992: 9). For the VCL, each period besides the Terminal Archaic and Paleo-Indian is then divided into Early, Middle, and Late.
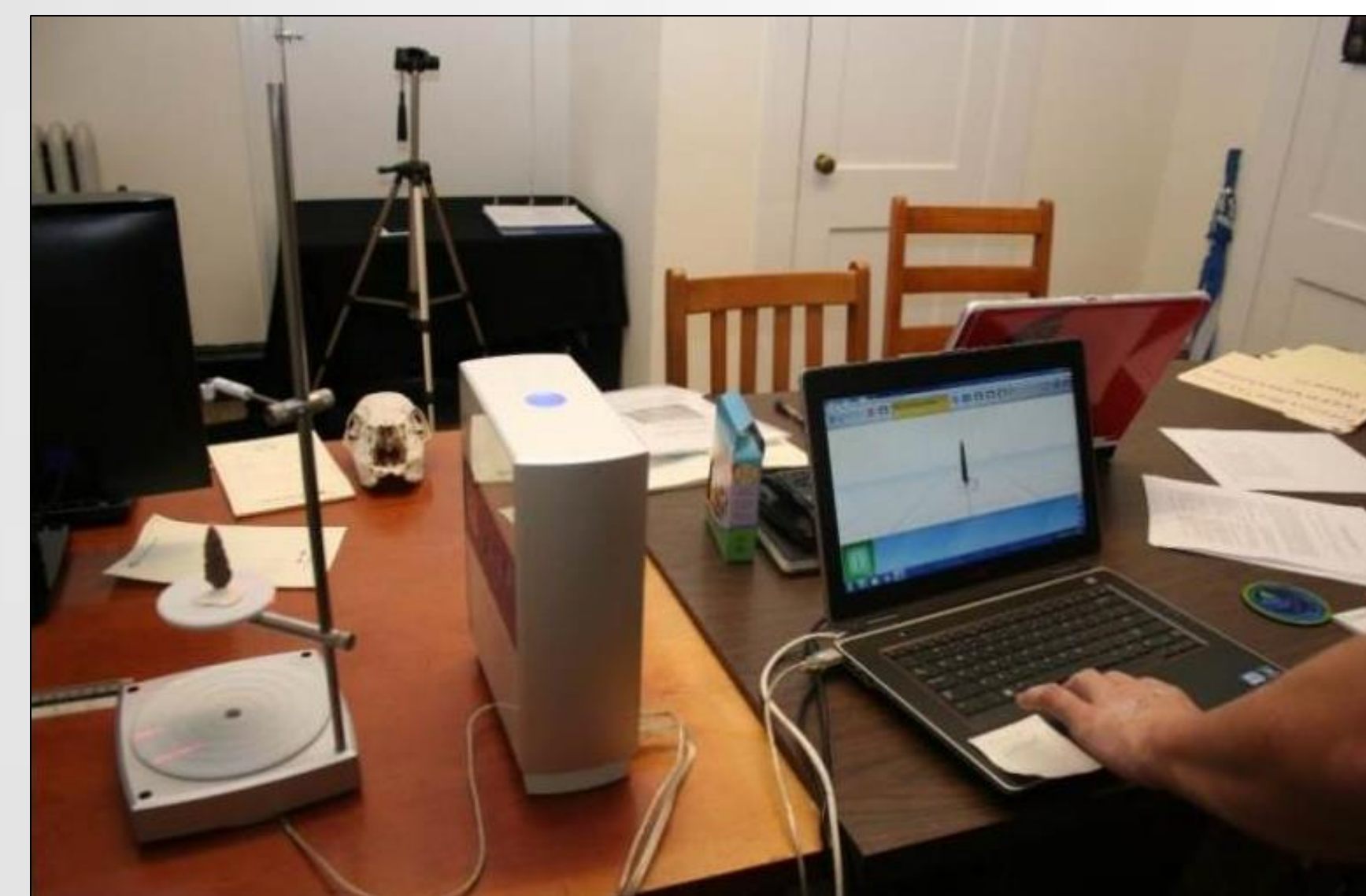
Point being scanned "with the NextEngine Desktop 3D Scanner" (Means et al. 2013)

Starting from the top left: Five plastic replicas from the VCL ranging from Paleo-Indian to Late Woodland (Taken by Sarah Perdue)
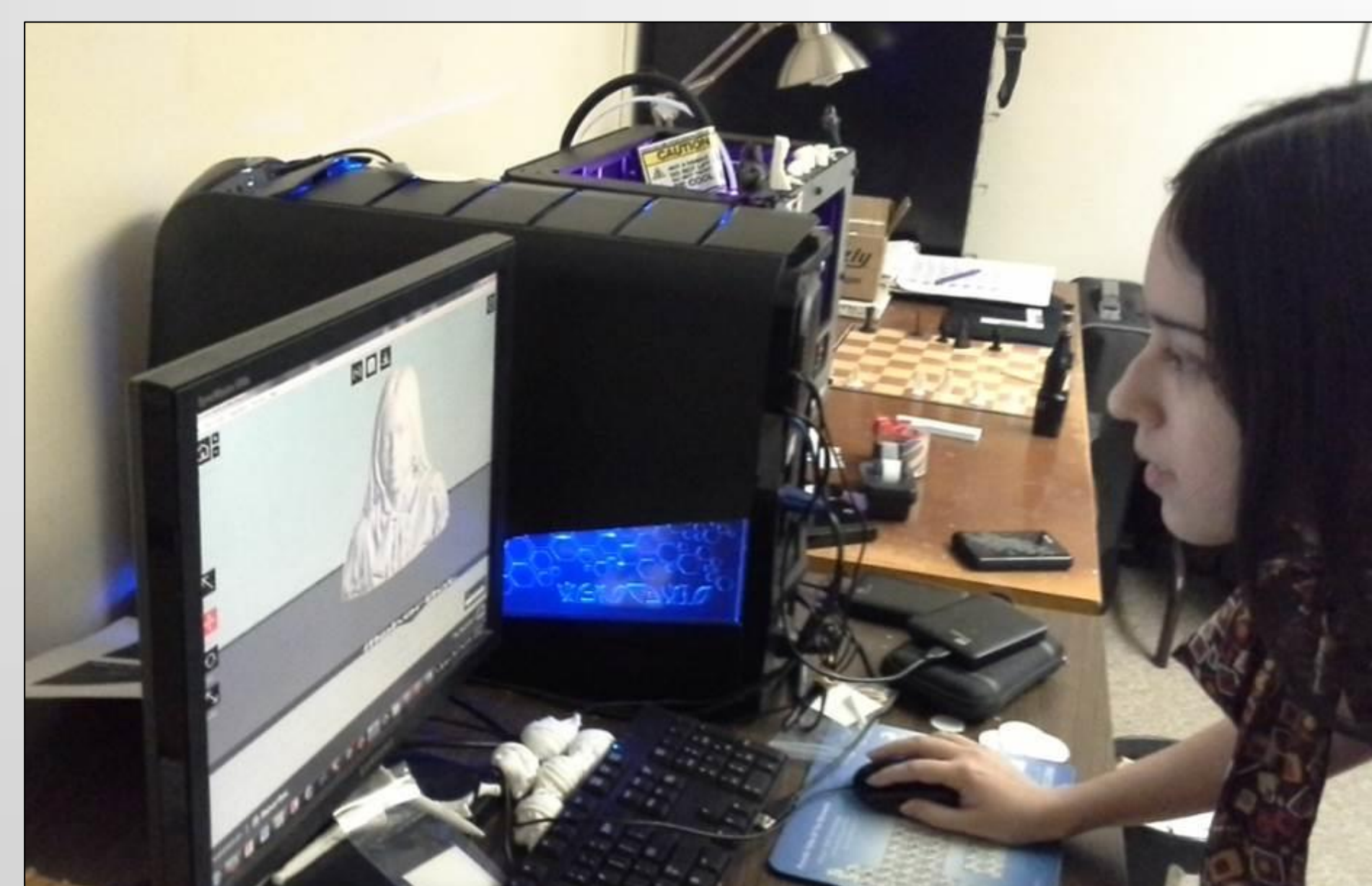
Intern Sarah Perdue getting ready to print (Taken by Dr. Bernard K. Means)

*Dr. Elizabeth Moore's lecture with plastic replicas provided by the VCL (Means 2014)*

Collaborations, Interactions and Interning

The VCL has traveled to many places and collaborated with many people and institutions in order "to create 3D digital models" (Means et al. 2013: 44). Their interactions with the public and "the archaeological and curatorial staff" at these places helped to expand their "notions of the research and interpretive value" of the digital models (Means et al. 2013: 44-45). They have had interactions with places like the Fort Lee Regional Archaeological Curation Facility, The State Museum of Pennsylvania, the Virginia Department of Historic Resources, George Washington's Ferry Farm, and more (Means et al. 2013). As an Intern with the Virtual Curation Laboratory, I have had close interactions with the artifacts scanned and printed. I get too interact with other archaeologists like Zooarchaeologist, Dr. Elizabeth Moore, who works as a Museum Curator at the Virginia Museum of Natural History (Means 2014). My job allows me to have easier access with all this and gives me a better view of the archaeological record and how those in the archaeological field interact with each other.

Results/Conclusion

The VCL can now greatly enhance "the curation, analysis, and interpretation of archaeological objects" through digital means (Means et al. 2013: ii). This virtual way of curating and printing of plastic replicas provides many benefits for the public and researchers (Means, McCuistion, and Bowles 2013):
- Cuts down on travel time to storage facilities.
- Allows access to objects that are too fragile to be handled or not on display.
- Provides another way of preservation and conservation when there are limited funds.
- Has "potential for promoting collaborative research efforts" (Means, McCuistion, and Bowles 2013: 10).
- Museum and site tours can be more interactive.
- Anybody can access the digital models and interact with them
- Research potential (ex: Interns at the VCL can do projects/presentations) (Means et al. 2013).
- Plastic models can be reprinted.
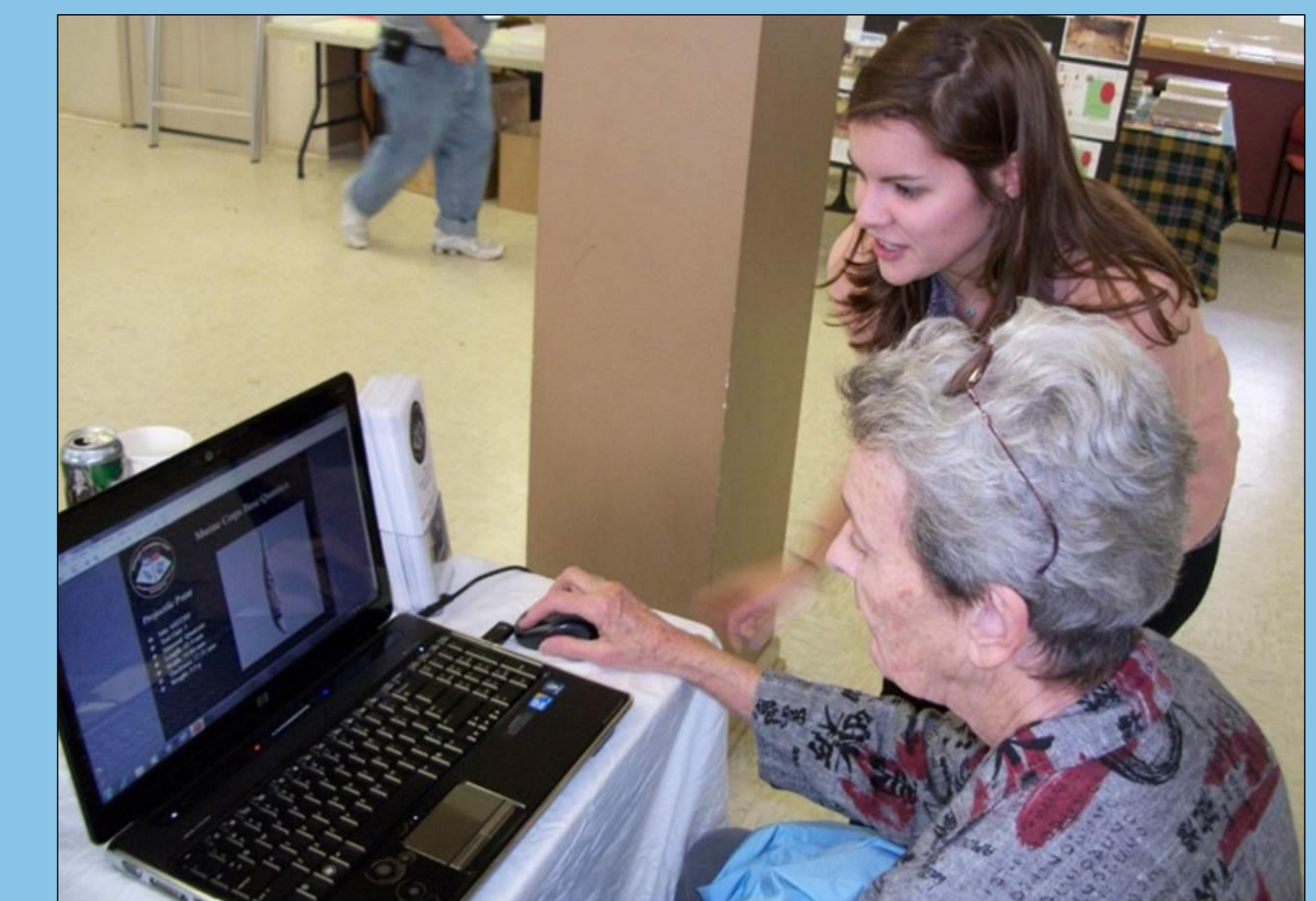
"Member of the Archeological Society of Virginia (ASV)" interacting with a digital model with a VCU student (Means et al. 2013)

These are just some of many benefits that people can use digital models for, whether it is for curiosity's sake or a research paper for school. There are those that won't believe it to be beneficial, but it is since the more time passes, the more the physical remains of the past start to decay or break. Besides allowing for more interaction and collaboration, the VCL has also shown that that 3D scanning has given a more permanent solution on preserving the past for future generations.

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Blogs of the VCL's work:
http://vcuarchaeology3d.wordpress.com/
http://virtualcurationmuseum.wordpress.com/