A DAY OF VIRTUAL ARCHAEOLOGY!

July 29, 2016 Michael Carter Augmented Reality,Commercial Archaeology, Day of Archaeology, Day of Archaeology 2016, Digital Archaeology, Experimental Archaeology Archaeological Services Inc., ASI, Canada,Computer Animation, digital media, HTC Vive, Iroquoian Archaeology, Iroquoian Longhouse, Museum of Ontario Archaeology, Oculus Rift, Ontario, Polymorphic3d, Sustainable Archaeology, theskonkworks, Virtual Archaeology, Virtual Reality, Wendat Archaeology, Western University

Hi, my name is Michael and I'm a Salvage Archaeologist who became a Computer Animator 20 years ago and now I'm using both my archaeology and computer animation skills to reimagine archaeological landscapes in virtual reality! Most of my days are now spent in front of a computer working in Autodesk Maya, Unity or Unreal game engines, but today we are with our friends at ASI | Archaeological and Cultural Heritage Services to see what archaeologists think about our recent virtual reality (VR) (re)imagination of a 16th century Wendat (Iroquoian) Longhouse.

Iroquoian longhouses were large dwellings made of flexible wood framing and shingled in bark in which multiple generations of families would live together. They were generally 7m's wide and the same in height and could be 18-120m's long! Typically they had doors on either end with a long corridor down the middle of the interior with cooking and heating fire hearths. For every one fire hearth you had two families share sleeping and storage bunks lined along the sides of the longhouse. Food, firewood and all sorts of daily tools and personal items were stored in the longhouse either hanging from the rafters, on or under the bunks. Smoke would constantly fill the longhouse as the fire and cooking hearths would be burning constantly, especially through the cold Canadian winters!

What's cool about Iroquoian longhouses in Ontario (Canadian) archaeology is that nothing survives of these once massive wooden structures except for the "post hole stains" in the ground, remains of fire hearths, storage pits or even burials within the disintegrated walls of these houses. In Canada we use "straws" to mark where every post-hole stain is. This gives us a visual indication within the archaeological field, roughly where and what the longhouse shape, length and width might have been.

2008 Alexandra (Ontario) Longhouse excavation – ASI

As only brief descriptions survive from European explorers and religious missionaries and drawn images are simple or inaccurate representations, we as archaeologists have no idea what longhouses really looked like. So we've turned to Computer Animation to see if we can recreate what a longhouse not only looked like, but also felt like through virtual reality.

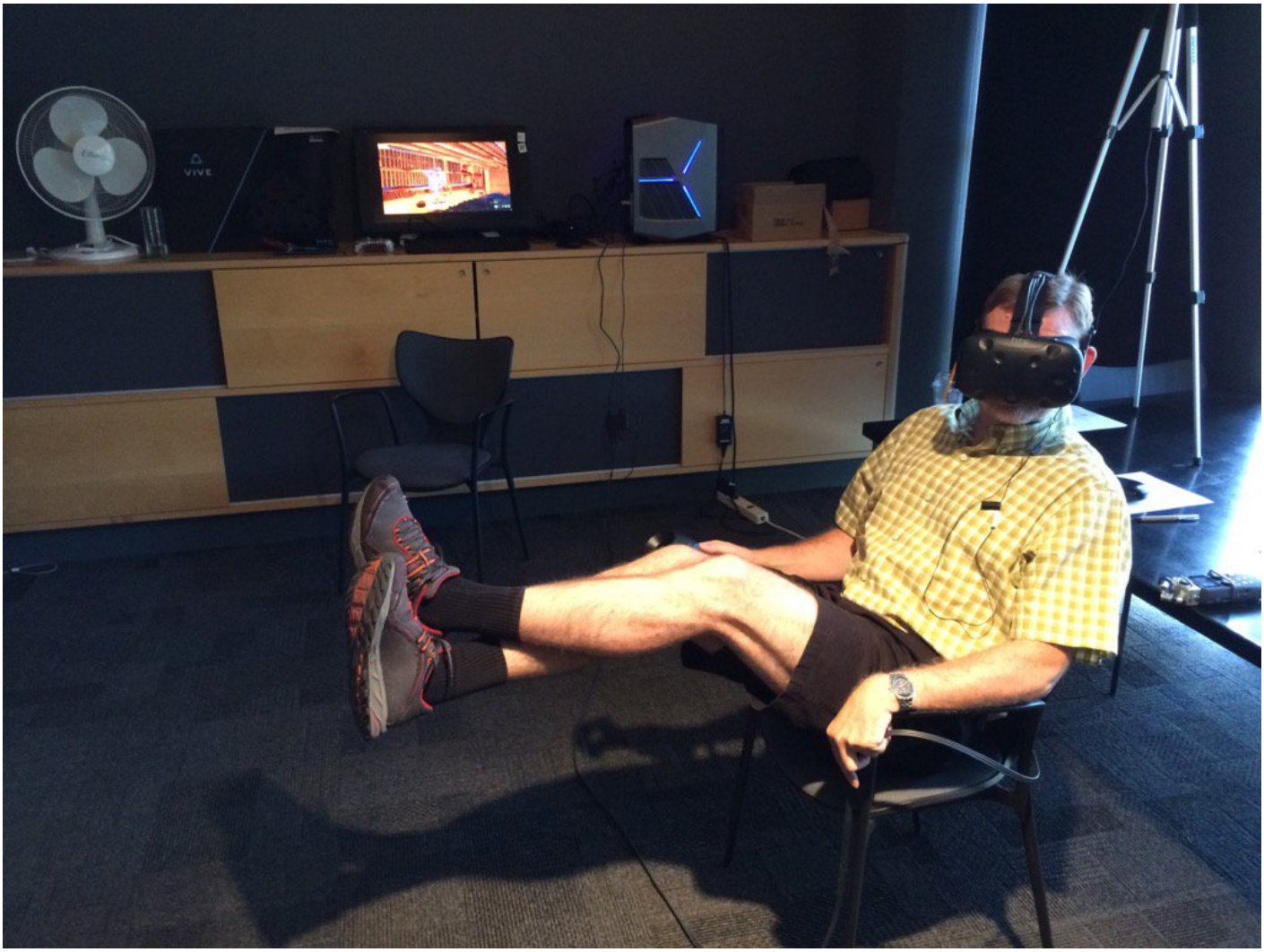
We use the archaeological evidence found in the ground to make an educated "guess" as to where the longhouse walls, supporting frame, front entrances and fire hearths would have been and then we use that information to start recreating it within 3D virtual space.

Interior 3D reconstruction of an Iroquoian longhouse

However, for everything else the archaeological record doesn't provide, we have to use information gleaned from historical writings, oral traditions from descendent populations along with good old detective work to recreate what we "think" the longhouse looked and felt like. Once we have built a representation of a longhouse in 3D, then that model and its texture maps are imported into either Unity or Unreal game engine and we start building the environment, sounds, special effects (like wind, smoke, dust) and all of the user controls so that people can navigate around the virtual reconstruction in real-time.

The video above is a recording of a virtual tour of my interpretation of longhouse might be based on the archaeological evidence and historical material I've researched. However what we are doing today is allowing other archaeologists who specialize in Iroquoian Archaeology to test their notions of what a longhouse looks like based on their own experience excavating longhouses in the field. This is important because even though what we have created may look real, it is only one of many interpretations. By comparing those interpretations, we learned more about the archaeological material we find.

We've provided the archaeologists with the new HTC Vive and setup the physical area in their office for the archaeologists to interact in physical and digital space. As you can see in the picture below, we can view what they are viewing in virtual space, but for them, it should be like actually being within the longhouse itself. As a researcher I'm testing whether they actually feel like they are in a longhouse and whether there is something that has been made in 3D that they agree or disagree with based on their own expertise.



Dr. Robert MacDonald, Partner and Senior Archaeologist at ASI is sitting inside the virtual longhouse bunk checking out the space!

Below is an in-Vive still of what Robert was looking at when he was sitting inside the bunk!

I have to get back to my interviews now, but if you are interested in finding out more, visit our project website at www.theskonkworks.com!

I would like to thank Day of Archaeology for hosting my post and ASI (Archaeological Services Inc.), Sustainable Archaeology (SA), Museum of Ontario Archaeology (MOA), the University of Western Ontario (UWO) for generously funding this research.