

# Abstract

## NCPTT - 3D Digital Documentation Summit

### Title: Evolution in Project Workflow - Is High Definition Survey the Missing Link?

#### Summary:

There is a major shift occurring in the preservation and building industry today. It was only 30 years ago that architects and engineers were designing and documenting projects by hand. Then, somewhat reluctantly, computer aided design (CAD) slowly moved in to replace hand drafting as a more efficient tool. Now building information modeling (BIM) has entered the scene. However, unlike CAD, BIM truly changes the way the industry works. We no longer draft, but actually design and build true virtual representations of physical objects; embedding information that can be tracked and changed on the fly. Not only does BIM allow architects to design and document in 3D, but also the entire project team, creating an environment that supports an integrated and collaborative process. Initially there was pushback, but now BIM is being accepted as the future of the industry, and with it comes a rush of supporting technology to dissect and analyze projects. Moving forward our job will be to filter and streamline this evolving process to make it efficient.

While this shift in workflow is great, it is generally targeted at new projects, or building something from nothing. For preservation and reuse projects there is an extra layer of knowledge required in the planning stages. Many times, intervening with modern technology and systems can have a devastating effect on mature buildings and structures, and before a proper solution can be provided investigation and analysis are needed. As architects and preservationists we have a duty to ensure that these resources continue to provide for their users, and survive their new interpretations or uses.

Advancements in technology have given us the ability to perform energy studies, material testing, and structural and hygrothermal analysis on existing buildings. These technologies provide insight into our decisions for the reinventing, or preserving and protecting, of these valuable resources. However, none of this matters if you do not have good base to start from. High definition survey, or laser scanning has stepped up to fill the gap in our evolving project workflow. It brings the real world into the digital one so we can interact with it virtually. Using point clouds produced from laser scans, digitized objects can be manipulated and measured in a 3D virtual environment giving users access to a complete 3D visualization of those objects. It is from this manipulation that existing conditions can be drawn up and modeled without hesitation. Structures can be dissected and analyzed without invasive testing. Perhaps most importantly, time on site can be spent viewing a project holistically, putting our experience and expertise to work on something other than narrowly focusing our attention on the discrete parts. This is especially significant for our office as we are often separated from our projects by great distances. Laser scanning allows us to take the site back to the office.

Initially our interest was in digitally capturing existing conditions. Success on a few small projects gave us confidence to expand its application to very large projects. As the technology became more accessible due to cost, we experimented with using it as an analytical tool; looking for patterns and irregularities in structures and surfaces. We even found a way to expand its value into the construction phase of projects where contractors used it as a basis for shop drawings to fabricate steel.

Laser scanning has proved itself to be a very valuable link in our evolving project workflow, allowing us to move into design quickly and with confidence. Recent mainstream adoption of this technology allows us to open point clouds directly in our current BIM software. Soon we will have the ability to automatically generate features from the point cloud. Our future outlook for this technology is high, and its value keeps growing as we find new uses for it throughout a projects life.

**Learning Objectives:**

- Participants will be given a brief history on architectural technology and project workflow, and its recently accelerated evolution. Laser scanning will be highlighted as a critical component of this shifting workflow for preservation and adaptive reuse projects.
- A series of case studies will be used to demonstrate the diverse capabilities and benefits of high definition survey from macro to micro, looking beyond digital preservation. Case studies may include.
  - Hurlbut Memorial Gate, Waterworks Park, Detroit, MI (As-builts of an ornate early 19th century beaux arts monument)
  - Ottawa Street Power Station, Lansing, MI (Existing conditions survey, 3D modeling and steel fabrication for a massive early 19th century power plant converted into a modern office building)
  - Quapaw Bathhouse, Hot Springs National Park, Hot Springs AR (Structural investigation and existing conditions drawings for the concrete dome of this historic bathhouse)
  - Keweenaw National Historical Park, Calumet, MI (Various projects including the restoration of a historic rail road snow plow, and recordation drawings of another historic building for conservation purposes)
- Attendees will learn how this technology may be applied in the future as we see it becoming a standard service when working on existing resources. New technology and techniques will be examined illustrating the potential of laser scanning's influence on the evolving project workflow.

**Topic Sentence:** Potentially the missing link in the evolving project workflow for preservation and reuse projects, high definition survey promises to make it's increasing value and accessibility an essential component of future projects. Learn the diverse capabilities and uses of high definition survey and its anticipated future applications.

**Speaker Contact Information and Bio:**

Brandon C. Friske, Quinn Evans Architects, 734-926-0418  
bfriske@quinevans.com, 219 1/2 N. Main Street, Ann Arbor, MI 48104.

Brandon C. Friske is an architectural designer in the Ann Arbor office of Quinn Evans Architects. Brandon received his Masters in Architecture from Lawrence Technological University in 2010. He is currently a member of Association of Preservation Technology – Eastern Great Lakes Chapter. Mr. Friske has been a featured speaker for laser scanning and technology at the Iron and Steel Preservation Conference and Michigan Historic Preservation Network Conference, as well a various regional venues.